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Plaster and Ammonia.

A correspondent of the *Genesee Farmer* says: "You have lately proved that gypsum, in its ordinary condition of dry powder, will not combine with carbonate of lime and sulphate of ammonia. I know it is a practical fact, from trial on a large scale. I also thought it would in some cases expel ammonia, because I had injured an experimental plat of turnips by mixing gypsum with guano. With no more chemistry than a gentleman obtains at college and retains scantily amid the varied duties and pursuits of life, I have a very high respect for the results that induction, like yours in the case above, will give us, but no confidence in the dicta of men like Liebig, whose genius (and I think he has a great deal of it,) is occasionally prostituted to fame."

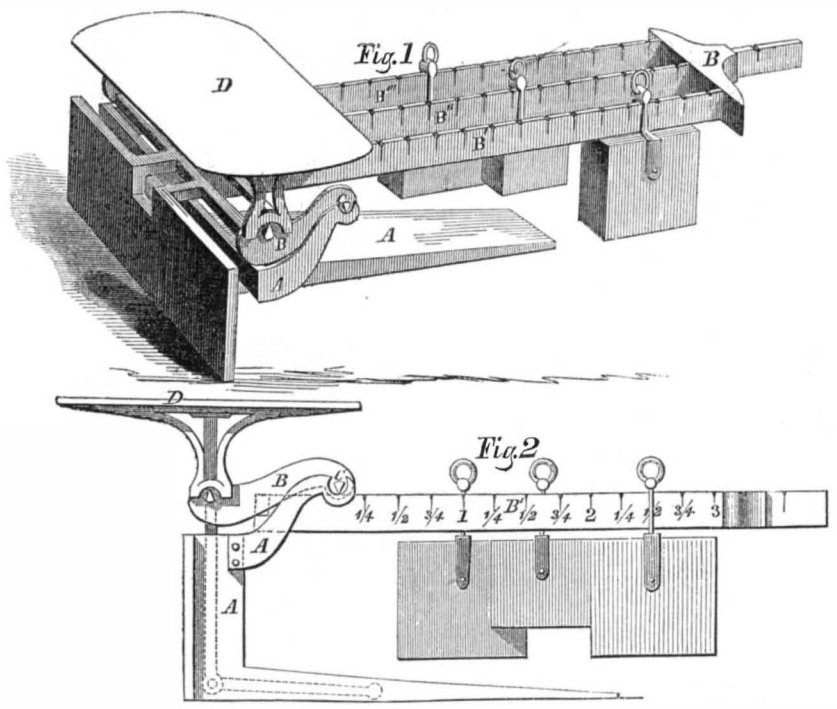
[We recommend this paragraph to the attention of our farmers. The lesson to be derived from it is, that gypsum should be moistened, when mixed with guano.

Falling Bodies.

The following table, giving the hight and the time of bodies falling, will be found very useful to millwrights in calculating the velocity of water, especially on falls under sixteen feet :—

Height of the fall in feet.	Time of falling in sec'ds.	Height of the fall in feet.	Time of falling in sec'ds.
1	·25	14	·935
2	·352	16	1·
3	·432	20	1·117
4	·5	24	1·22
5	·557	25	1·25
6	·612	30	1·37
7	·666	36	1·5
8	·706	40	1·58
9	·75	45	1·67
10	·79	50	1·76
12	·864		

IMPROVEMENT IN WEIGHING SCALES.



Improvement in Scales for Weighing.

The invention illustrated in the accompanying engravings differs from the common scales in having the after part of the weighing lever composed of three or more arms—an arrangement which permits the apparatus to be condensed into a small space, while its capacity is very great; the construction also does away with the necessity of removing the weights from the scale beams, and thus saves much inconvenience.

In our engraving, fig. 1 is a perspective and fig. 2 a sectional view. The apparatus is supported on a standard, A, and the weighing lever, B, which operates in the common manner, but is made with three arms, B′ B″ B ‴, has its fulcrum at C. The articles to be weighed are placed on the platform, D, which rests upon a knife edge on the lever, B.

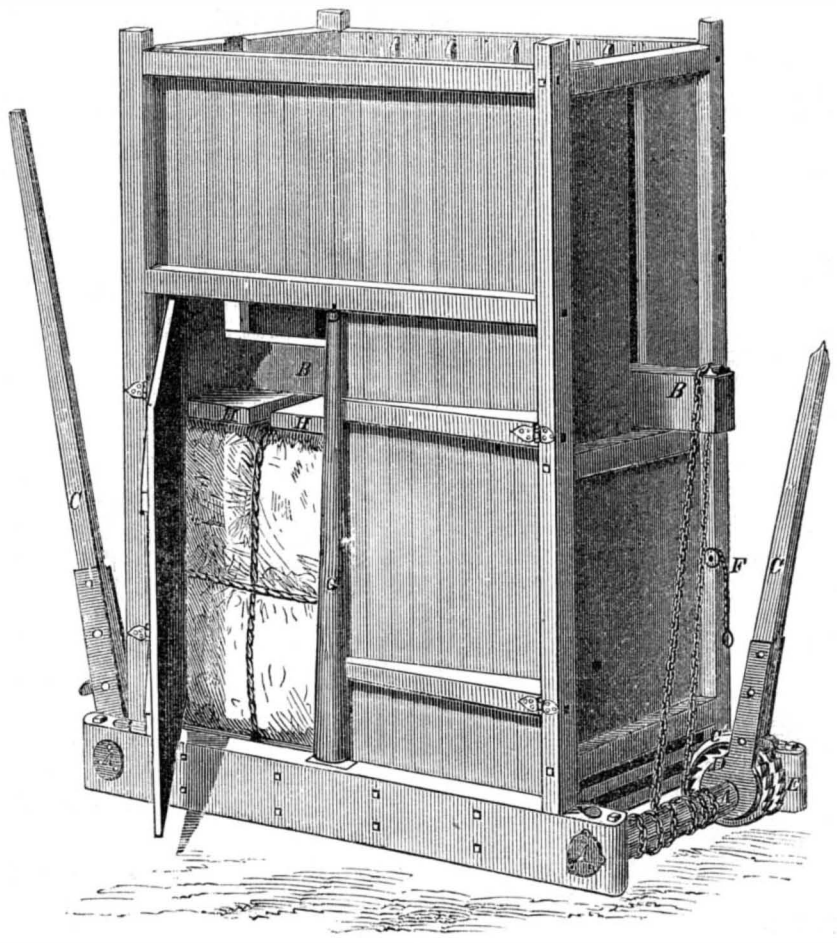
The weights upon the arms, B′ and B‴, it will be noticed, are both of the same size; if they were both moved out on the arms, double the quantity of material could be weighed than if only one arm and one weight of the same dimensions were employed.

The tare may be indicated with great facility by using one of the weights for that purpose. The smaller weight is intended for use in indicating the fractional parts. If all of the weights are not wanted for immediate use, they may be shoved up under the fulcrum, out of the way, but still remaining in a convenient position. An additional or extra weight may be hung upon the extreme end of lever B, when necessary.

The simplicity, compactness, and accuracy of these scales must be apparent to every one. The field for their introduction is large. The improvement may be attached readily to the ordinary platform scales; indeed, the variety of form in which the principles of the patent can be presented, is endless.

The inventors, Messrs. S. S. Mills and M. Bissell, of Charleston, S. C., will be happy to give any further information. The patent bears date Feb. 5, 1856.

IMPROVED HAY PRESS.



Press for Hay, Cotton, &c.

In this apparatus there is a strong shaft, A A, placed at each of the lower ends of the frame. The compression is effected by means of chains extending from the shafts to the ends of the follower beam, B, the chains being wound up on the shafts; the latter are rotated by means of the levers, C C, the hooked pawls of which, C′, catch in the teeth of the ratchet wheel, D. The force with which the compression is effected is limited only by the length of the levers, and as these may be easily extended, the effective power of the machine is truly enormous.

E is a secondary ratchet wheel, having a spring pawl, not here shown, which holds the purchase on shafts, A A, during the back strokes of the levers, C C. F is a cord for releasing, at pleasure, the pawl of the secondary ratchet wheel, E. The levers, C C, are not permanently attached to shafts, A A, and may therefore be removed out of the way when not wanted for use.

The ends of bar G, which hold the doors together, fit into mortices in the frame-work of the machine, and thus relieve the doors from strain; the hinges being placed on the outer surfaces of the cross-pieces, the door will not fly violently open when the bar, G, is released and damage is thus prevented. The platform, H, is composed of separate pieces of plank, and is thus easily handled; the pieces are kept slightly apart by means of guide posts

This press is strikingly simple in all its parts, strong, portable, and cheap in construction. The invention is highly spoken of by all who have had it in use.

For further information address the inventor, C. J. Fay, North Lincoln, Me. Patented July 11, 1855.

A Great Artesian Well.

A new Artesian well is being bored in the Avenue Charles X., at the angle of the Avenue St. Cloud and Petit Pare, near Paris, for the purpose of supplying the ornamental lakes of the Bois de Boulogne. An interesting paper has been communicated to the Academy by M. Dumas on the subject, from which it appears that Mr. Kind, the engineer, has undertaken to bore a well 29 inches in diameter, and continue the sinking, if necessary, to the depth of 2500 feet, and thus obtain a daily supply of 10,000 cubic meters of water, being nearly equal to the volume of water delivered by the Seine through the Pont de la Tournelle, at Paris. The boring was commenced on August 2d last, with a diameter of about 41 in. For some time, when the operations were through marl and chalk, the average daily progress was 16 1-2 feet; then, through sand, it was reduced to 8 1-4 to 10 feet; and now, having reached another stratum of chalk, containing boulders, the speed is 5 feet, the depth being already upwards of 980 feet, and by May 1st it is expected that the enormous depth of about 2360 feet from the surface will be attained, being more than 490 feet deeper than the Artesian well at Grenelle. The motive power is a steam engine of 24-horse power.

Red Granite.

Lord Stanhope, in the course of his lecture before a scientific society in London, speaking of the fragments of marble found in the alluvial soil which covers to a considerable depth the site of the Forum of ancient Rome, says that among the various marbles thus discovered, were considerable portions of red granite, known to exist in upper Egypt; and then his Lordship adds, that all the red granite which now supplies the world, is derived either from the estate of the Earl of Aberdeen in Scotland, or else from the scattered fragments which the excavation of ancient cities yield. It is singular that the learned lecturer had never heard of the vast quarries of red granite in Finland, of different shades, and susceptible of a polish equal in beauty to the most compact marble. In the deep gorges of the White Mountains, in New Hampshire, a species of beautiful red granite is found.

Bituminous and Anthracite Coal for Boilers.

The ferry steamboats plying on the East and North rivers between this city and other places now use bituminous coal for fuel. Two years ago anthracite coal was exclusively used. We have been informed that the bituminous generates steam as rapidly as anthracite, is not so severe on the metal, and on the whole is cheaper.

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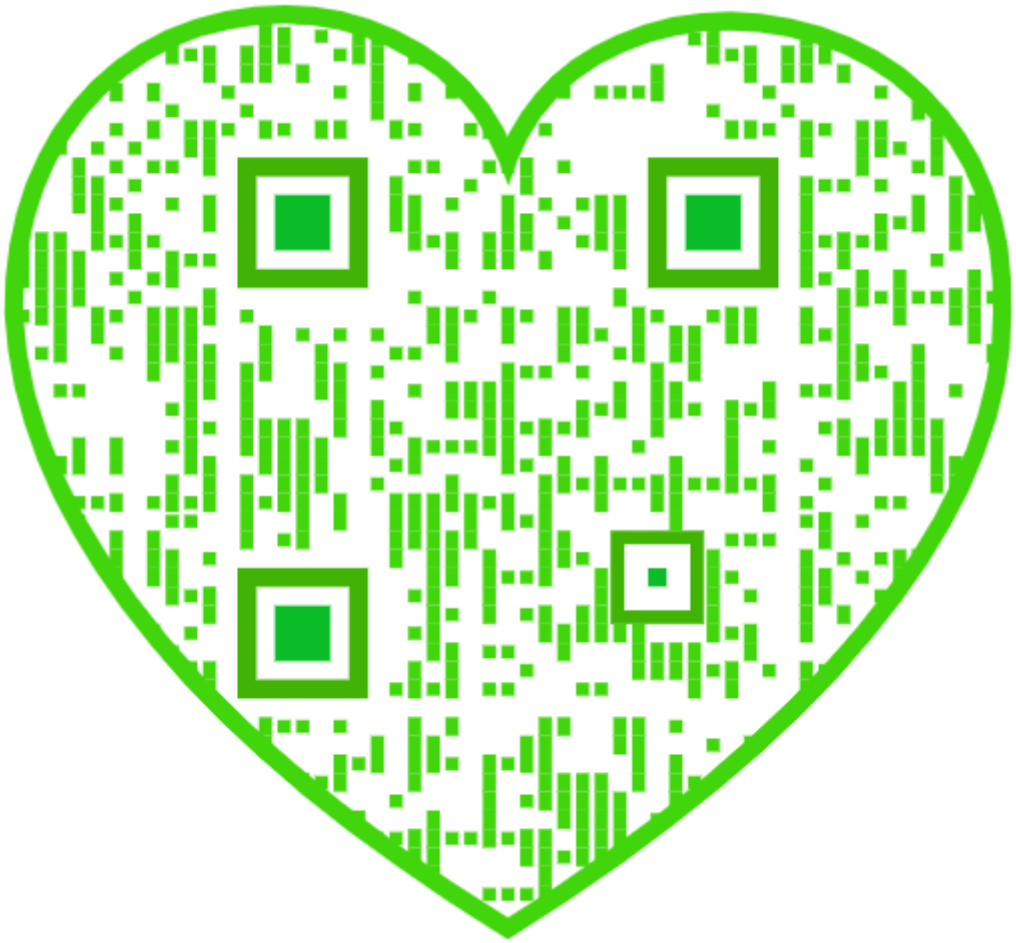

[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING APRIL 8, 1856.

DRYING WET GRAIN, &c.—Stephen W. Appleby of New York City: I claim the application of revolving cylinders situated in a heated flue, with their ends projecting into flues, into which cold air is forced and so arranged that grain or other similar substances put into the top cylinder, will slide through the same, and then fall into the next cylinder, and so on from one to the other, being in its passage alternately subjected to the action of heat while in the cylinder, and to the action of cold air while falling from one cylinder into the other, for the purpose specified.

PROPELLER SHAFTS IN KEELS—Aaron Arnold, of Troy, N. Y.: I claim the manner of inclosing propeller shafts in keels, B B, made of sheet iron or other material, fastened to the vessel's bottom, for the purposes and in the manner substantially as described.

LOOMS—E. B. Bigelow, of Boston, Mass.: I claim connecting the tension roller, or its equivalent, with the let-off motion to regulate the delivery of the warps by the arm or feeders, Z, substantially as specified.

I also claim the devices for holding the tension roller or its equivalent firmly at the beat of the lathe, substantially as described.

I also claim the mode of constructing the belt cam and combining it with the shipping lever, substantially in the manner and for the purposes specified.

I also claim the mode of connecting the friction brake with the shipper and stop motions of the loom, substantially in the manner and for the purposes set forth.

Finally, I claim releasing the said friction brake to allow the loom to be turned by hand, substantially as specified.

COOKING RANGES—John Plant and C.G. Ball, of Washington, D.C. We do not claim the alternate arrangement of a series of furnaces and ovens.

We claim the arrangement of the fire chambers, A, ovens, B, and front plate, d, in such relation to each other as to admit the products of combustion to pass through the flue, X, over the top plate of the oven, then down through the flue, F, in front of the fire chamber to the flue, G, beneath the oven, substantially as described and for the purposes specified.

HYDRANTS—E. J. Baker, of Baltimore, Md.: I claim the application to a hydrant of the receiving chamber and piston, constructed and operated in the manner and for the purpose substantially as described.

PRESSURE BELLS—Jason Barton, of Middle Haddam, Ct.; I claim so suspending the hammer by a point near the top of the bell, but out of a center thereof, as that the said hammer shall swing from a point near the edge of the bell into the top part of the interior of the bell, and vice versa, thus allowing it a downward velocity, and a very long movement, and at the same time allowing it to strike the bell near the edge, and at right angles, or nearly so, to its surface.

DOOR FASTENERS—G. H. Lindner, of Hoboken, N. J. I claim the two catches, a and b, provided with hooks or curves, d e, at their ends, which pass around the pin, D, attached to the still or lintel of the door or window frame, the catches being fitted within the case, B, which is attached to one of the doors or windows, the catch, b, being provided with projections, g h, against which the bar, C, attached to the other door or window, acts substantially as shown, for the purpose specified.

FASTENING DOOR KNOBS—Nathan Benham, of Hartford, Conn.: I claim, in securing the shafts to door knobs, the use of the slotted shaft, F, with the wedge-shaped hole, D, as described, said shaft being opened by a screw or its equivalent, in the manner substantially as set forth.

SEED OF BROOM CORN—G. E. Burt, of Harvard, Mass. I do not claim the setting teeth spirally on cylinders, I am aware they have been so used a long time. Neither do I claim an endless belt constructed of any proper material having lugs or spikes, as described, in combination with comb rollers set diagonally upon a frame, as employed by L. D. Grosvenor, patented Sept. 23, 1851.

But I claim the combination of the wheel, B, or its equivalent, such as a rim or a circle, having one or more rows of teeth in its periphery with one or more cylinders, C, placed parallel or nearly so, with the plane of the wheel, B.

I also claim the bar, D, arranged in the manner and for the purposes set forth.

I also claim the spur roller, K, in combination with the plate, L, substantially as described.

SHOT GUNS—Geo. Buckel and Edward Dorsch, of Munroe, Mich.: We do not confine ourselves to any particular number of divisions of the bore.

But we claim giving the bore the undulating form substantially as described.

MAGNETO-ELECTRIC MACHINES—Calvin Carpenter, Jr., of Providence, R. I.: I claim, first, the cut-off, consisting of the geared segments and gear wheels or wheel, and thus serving the purpose of springs, and driving a revolving prism, or its equivalent, for rapidly breaking the currents, substantially in the manner and for the purposes set forth.

ROTARY PUMPS—Thos. Crane, of Fort Atkinson, Wis.: I claim connecting the shaft, C, to the hub, D, in such a manner that without opening the pump case, the periphery of the annular piston, E, can at any moment be forced outwards into close contact with the periphery of the pump chamber, substantially in the manner set forth.

SASH FASTENER—T. G. Crooke, of New York City: I claim combining with the bolt of a self-acting latch, an engaging and disengaging catch constructed and operated substantially as described.

TEMPERING FURNACE—R. B. Fellows, of Shelburne Falls, Mass.: I do not claim the hardening or the plate, P, for drawing, when accomplished or employed separately by separate fires.

Nor do I claim the use of the tubes or the plate before mentioned, except when combined and arranged as described.

But I claim the combination of the plate, P, and the tubes, T, or their equivalents, with a single fire in the manner and for the purposes substantially as set forth.

VISE—O. V. Florey, of Yellow Springs, Ohio: I claim the use of the ratchet brace, G, operating in connection with the ratch, H, sliding beam, D, and movable jaw, C, substantially in the manner set forth.

PLANING FELLIES—A. W. Fox, of Athens, Pa.: I claim the arrangement of the movable pinions, f g, gearing respectively into the series of cogs, h i, on the crown wheel, M, in combination with the device for gearing and ungearing said pinions at the proper moments, substantially as described, whereby the carriage is automatically fed along slowly, then returned at a more rapid rate, and finally stopped, while the cutters continue to revolve with uniform motion.

I also claim the combination of the clamping apparatus, arranged as described, with the lever arms, O L, and spring, P, for the purpose of automatically releasing the fellies, substantially as set forth.

I also claim the device for throwing the fellies from the machine, arranged, and operating substantially as specified.

BOILER REGULATORS—Wm. S. Gale, of New York City: I claim the lip, e, of the piston cap, F, and the spring, d, arranged in relation to each other and to the piston body, for the purpose of clamping the packing, b, set forth.

FLOOD GATES—Geo. W. Flanders, of Lynn, Mass.: I claim constructigg the gate of one part, and hanging or hinging its lower end to the apron or bottom of the flume, A, substantially as described.

POLISHING LEATHER—Wm. P. Gamble, of Philadelphia, Pa.: I claim effecting the rectilinear motion of the flint or glass, when in contact with the leather upon the strap, by means of the compensating devices set forth and described, the said devices being constructed and operating substantially in the manner described,

CARRIAGE COUPLING—Wm. Greenleaf, of Greenfield, Ohio: I claim the application of the moving rods E F G H, the circular, T, plate, C D S, and the half circle, A O B, as described, or any other apparatus substantially the same, and which will produce the same effects.

SUBMARINE LANTERNS—C. M. Gould and C. B. Lamb, of Worcester, Mass.: We claim, first, the two concentrically arranged glass cylinders having an air space between them, in the manner and for the purpose specified.

Second, the air chambers, J and Y, with the communicating perforations, H H, and spring valves, J J, in combination with the feed and escape pipes, F F, constructed substantially in the manner and for the purposes described.

SIFTING COAL, &c.—Saml. Harris, of Springfield, Mass. I claim providing the pins, a a a, on the underside of the cover, A, of the sifting box, B, in such relation to the bottom of the vibrating sieve, C, that when the top of the box is closed, and the sieve vibrated back and forth, they shall separate, the material being sifted, and thus improve and facilitate the sifting operation, and when the top of the box is opened they shall be out of the way, and thus allow for the convenient removal and replacement of the sieve, substantially as set forth.

OIL FROM COTTON SEED—A. A. Noyes, of Boston, Mass. (assignor to George Ashman and Chas. Phelps, of Springfield, Mass.): I do not claim any mode of crushing the matured seed or expressing the oil from the kernels.

I claim the maturing of the cotton seed, after it has been separated from the cotton by heat, artificially applied so as to render the husk brittle and easily separable from the kernel.

SLIDE VALVES—Wm. M. Henderson, of Baltimore, Md. I claim the arrangement of the valves and the means for operating them, as set forth, by which the entire exhaust is controlled by a non-pressure valve enclosed and working within the balanced cut-off induction slide valve, and worked by separate mechanism in the same plane. The time of cut-off and exhaust being variable at pleasure, and in no way connected or affected by the movements or operations of each other.

TAPERING WHALEBONE FOR WHIP HANDLES—Liveras Hull, of Charlestown, Mass.: I claim combining with the cutter cylinder and the bed plate of the machine mechanism, substantially as described, to operate against and be operated by the sides of a stick of whalebone, and so as to control or regulate the vertical movements of the rotary cutter cylinder, substantially as specified.

I also claim constructing the cutter cylinder and combining it with the plate, C, as described, or by such devices as will enable it to be moved endwise, for the purpose as specified.

MORTAR—H. W. Hunt, of Peekskill, N. Y.; and John Sands, of Greenwich, Conn.: We claim the combination of the annular bed, A, wheel, D, attached to the rotating C, and drag, E, these parts being constructed and arranged, substantially as shown for the purpose specified.

ENVELOPES—R.T. Knight, of Philadelphia, Pa., I claim the lapping and interlacing of the ends and the full width the back being the full wieth and length, turning over the enclosed letter, so that when the clasps are in, it is impossible to open it without detection.

Also the application of the metal clasps to the envelope and letter, or both together, making it one and the same parcel, for the better security of the contents, and also to fix the date of mailing the enclosed letter, which is highly important in many legal and public documents.

LOCKS—Wm. Maurer, of New York City: I claim the tumblers, B, having slots, e e, made in them, as shown, in combination with the slotted bolt, D, bolt catch, E, arm or lever, F, and bit, C, the above parts being arranged as shown and described for the purpose specified.

AUTOMATIC VALVE—Earl Parker and Wm. Reynolds, of East Hartford, Conn.: We claim the employment, when combined substantially as specified, of oil and water, or their equivalents, for the automatic closing or moving of the valve by expansion of the said fluids in their liquid state, essentially as set forth.

And we further claim the arrangement, essentially as specified, of the inner and outer bells, e B, tubes, perforations or passages, c d h, and interior piston or valve, g, for operation, in the manner as set forth.

DOOR LOCKS—Andrew Patterson, of Pittsburg, Pa.: I claim the use and employment of a vibrating bolt which shall act as a brace between the seat in or the shaft on which it vibrates, and the jamb piece or keeper, into which it falls without any other leverage or any other point, and this I claim without reference to the manner in which, or the machinery by which the said brace bolt is operated.

CHARRING WOOD—S. S. Perry, of Charles City Co.' Va.: I claim the process or mode of charring wood, or as it is commonly called burning charcoal by the application of hot or heated air to the wood to be charred, as described.

GOVERNOR VALVE FOR STEAM ENGINES—H. H Smith, of Cincinnati. O.; I claim the self-adjusting rings, combined with the eccentric, 5 and 6, or their equivalent, operating substantially as and for the purposes set forth.

FELT GUIDE OF PAPER MACHINES—P. H. Wait. of Sandy Hill, N. Y.: I do not claim the roll, D, nor the use of a roll to guide the felt, for this has been previously used in various ways.

But I claim the employment and use of two crooked levers, E E, hung upon pivots, L L, and operated by connecting rod, G, and guide pins or friction rollers, F F, against which the felt bears working the rod, G, and levers, E E, changing the position of the roll, D, by action of the felt, substantially as shown, for the purposes set forth.

BOILER FOR COOKING BY STEAM—Edward Whiteley, of Boston, Mass.: I claim the trap, G, and cap, I, as arranged and applied to the vessel, B, whereby the latter may be employed either as a boiler or steamer, as set forth.

TREATING SURFACE SPRINGS.—Anson Wolcott, of East Bloomfield, N. Y.: I am aware that placing an open barrel or box, so as to surround a spring, is not new, but in that case it does not admit of covering the same with earth, nor remedy the evil of soft earth or miry margins to springs; nor do they prefent surface water with its impurities, nor insects from entering, nor prevent changes of temperature consequent to said open springs. I am also aware that closed cisterns for retaining water introduced into them, are not new, therefore I do not claim any of these methods.

But I claim the use of an inverted vessel, constructed with an edge susceptible of being forced into the clay pan through which the spring issues; said vessel provided with a discharge pipe, foe the purpose of capping springs so as to admit of surrounding and covering the inverted vessel with clay, substantially as described.

BASIN COCKS—Charles Harrison, of New York City: I do not claim either a screw valve or a basin cock operated by the pipe that passes the water, as these separate articles are well known. But I am not aware that the screw valve and bent pipe have ever before been combined with the stop, 6, that insures the said pipe being turned off from the basin in that direction which is necessary to screw the valve down on to its seat instead of further opening it as described.

I claim the screw plug, e, and its valve, 3, actuated by the bent pipe, f, when combined with the stop, 6, in the manner and for the purposes substantially as specified.

SOWING SEED BROAD-CAST—Jesse Lincoln, of Uniontown, Pa.: I claim the combination with the hopper, G, the seeding roller. H, provided with open cells, c, passing through it, and rocked through the hopper to receive and discharge the grain broad-cast, substantially as described.

CORN PLANTERS—Edward P. Lacy, of Rochester, N. Y.: I claim in combination of the seat, S, with the treddle or foot lever, t, rod, r, bar, m, and racks and pinions, P P, the whole operating in the manner and for the purpose set forth.

SLATE FRAME—Edwin Young, of Philadelphia, Pa.: I claim a slate frame made of a single piece of wood provided with a groove to receive the edge of the slate, and bent so as to fit it, with the ends fastened together.

POLISHING BUCKELS—Robert G. Pine, of Sing Sing, N. Y.: I claim the combination of the polishing and guide wheels, C D D, with the rotating and longitudinally moving shafts, E E, provided with clamps, F', the shafts, E E, working in yielding or elastic bearings, substantially as shown for the purpose specified.

SPOKE SHAVE—Martin Snow, of North Bridgewater, Mass.: I claim my improved manufacture of a heel or spoke shave knife, made of one piece of steel and with both of its starts bent or formed in the shape of springs in manner as specified.

MAKING ENVELOPES—W. W. Cotton, of New York City: I claim, first, operating the feeding, gumming, partial, and complete folding, pasting, and delivering devices from two shafts, so united that the rotary motion of one shall give a rocking motion to the other, substantially in the manner described.

I also claim the feeding up of the blanks by the two feeding plates, each one carrying it up a portion of the distance and delivering it against the stops or guides from whence it is carried through the machine and completed.

I also claim the combined operation of the paste box and pasters, the former operated from the rock shaft, and the latter from the revolving one, through the intervention of devices substantially such as set forth.

I also claim in combination with the block, P, the folders, 1 2 3 4, the hinged points of which are covered and the swell of the hinges facing each other for the purpose and substantially in the manner set forth.

I also claim in combination with the holders, 1 2 3 4, the sliding cam plates, C', with their several connections for operating said folders in the manner and order substantially as described.

REGULATING PUMPS BY WIND WHEELS—Jacob W. Goodwin and Moses C. Hawkins, of Edenborough, Pa. We claim, first, the construction of a wind wheel with the sails shaped like a funnel and always presenting the open ends of those on one side of the wheel to the blast.

Second, we claim the construction of the float, M, and the lever, O, with the elevating rod, P, in combination with the wheel, H, so constructed in the manner described as to be raised and lowered by the rising and falling of the float, M, in the manner described or by any other construction substantially the same and which will produce the same results.

VALVES FOR HYDRAULIC ENGINES—John D. Heaton, of Dixon, Ill.: I claim the construction, use and application of the swinging or vibrating band, valve devices, T T c c c c, hung on or attached to an axle or shaft, e e, and operated by the slotted connection rod, J W, and wrist pin, S, as set forth,

I also claim in combination with the said valves the construction and arrangement of the water chests or the chambers, C C D D, the compartments, F C E H, with the pipe, J K, substantially as described.

CHUCK FOR LATHES—Michael Neckerman, of Pittsburg, Pa.: I do not claim the beveled toothed rim, F, nor the pinions, f, on the screws, D, by which the jaws, B, are operated, for this device has been previously used.

But I claim the annular rim, E, having inclined projections, j, attached to it, the projections, j, fitting or working over projections, i, on the back of the groove, h, the toothed rim, F, being placed over the rim, E, the above parts being arranged substantially as shown for the purpose set forth.

BENDING WOOD—Edward J. Updegraff, of York, Pa.: I claim the method of operating the form upon which the wood is bent by bringing it hard down upon the platform by means of the screw, v, and giving it motion by means of the platform beneath it, whether endless chain or otherwise, as above described, separately and in connection with the arrangement of the wheels, F and I, the screw, o, the spring, u, the frame, K, and the slide, H, substantially as set forth.

PIPE MOLDING—John Demarest, (assignor to the J. L. Mott Iron Works,) of North Haven, N. Y.: Core bars have been made with wings between which to pack the sand, and which have effect to bind and hold the sand forming the core, this I do not claim.

And I am also aware that core bars have been made with branches connected therewith by dovetail joints, so that the branches of the core bar can be separated in the pipe after the pipe has been cast, but these as heretofore made, required to be sustained centrally in the mold by inside bearers, which injure the castings. I do not, therefore, claim the connecting of the branches with the main core bar by dovetail joints irrespective of side wings or plates which rest on the surface of the flask to sustain the branches in a true central position without bearers.

I claim making core bars for molding curved elbow or branch pipes, and other such like hollow castings with sustaining plates or wings at the ends, substantially as and for the purpose specified.

WASHBOARDS—Royal Hatch, (assignor to Henry C. Hatch,) of Stafford, Vt.: I do not claim the beaded rounds irrespective of the manner in which they are arranged or fitted together, for they have been previously used.

But I claim the beaded rounds, E, when secured in the frame of the board, as shown, viz., by having tenons on the ends of the rounds fitted in the grooved rails, B B, and the beads, e, of every alternate round fitted in the cavities or hollows, d, of the intermediate rounds as shown and described for the purpose specified.

BOXES FOR AXLES—Julius Bevin, (assignor to himself and Sam. N. Stillman,) of Unadilla Forks, N. Y.: I am aware that hub boxes with a flange to partially close the hole in the end of the box without a score behind it have long been in common use, therefore I do not claim a box with a flange without a score behind it.

But I claim the new manufacture of the hub box described for wheels which turn upon their axles, to wit., a hub box with a score or groove behind a flange which partially closes the end of the box, said score affording room for the washer to play within the flange and it also receives a packing to prevent more effectually the escape of the lubricating matter and to exclude the dirt from the box and axle, substantially as described.

R. R. CAR BRAKES—R. M. Evans, (assignor to R. M. Evans and Chas. S. Gale,) of Laconica, N. H.: I claim the arrangement and combination of slots, a a, of the brake rod, D, with the chains, f g, and brake levers, b c, in such a manner that one of each pair of levers will be operated immediately by the brake rod at the end of its respective slot, while the other lever of each pair will be moved in the other direction by the action of said chains in which ever direction the cars may may be moving, substantially as described.

OIL CANS—Thomas Priestly, (assignor to Daniel Holden,) of Saxonville, Mass.: I claim combining with the oil vessel, A, and arranging with respect to the discharging tube, B, thereof, substantially as described, a weight, C, whereby when said oil vessel is overset, the gravitating power of the weight may move the discharge tube into a position from whence no fluid or oil may escape from it.

I also claim arranging the air inlet tube, so that its opening into the air vessel and its opening for the reception of air shall be on opposite sides of the axis of the vessel or with respect to the weight and oil discharge tube, essentially as specified.

MAKING ENVELOPES—Wm. H. Lowe, of Albany, N Y.: I am aware that atmospheric pressure has been employed in envelope machinery simply for the purpose of feeding the blanks to the folding apparatus. I therefore do not claim its use for that purpose.

I claim, first, the cutting out of the blank by a shearing cut, substantially as described, and for the purpose of making a smooth cut.

Second, I claim the position of the knife to economize the waste of paper, substantially as described.

Third, I claim drawing the blank through the hole in the face plate, B, thereby giving to the flaps a preliminary fold.

Fourth, I claim holding the blank by means of atmospheric pressure while the folders are operating.

Fifth, I claim the adjustable blocks, j j j j, substantially as described.

Sixth, I claim drying the gum for the sealing flap by means of a current of heated air.

Seventh, I claim feeding the paper to the knife by means of the feeding rollers, o o.

Eighth, I claim the c m movement, substantially as described, in combination with the hollow slide, D, and for the purposes set forth.

Ninth, I claim the mode of folding the finger, R, substantially as described and for the purposes set forth.

HEATING AND VENTILATING BUILDINGS.—John Sawyer, (assignor to himself and Thos. Hale,) of Fitchburgh, Mass.: I am aware that a smoke pipe has been enclosed in a casing so as to leave a space around the said pipe for the reception and heating of external air, and carrying the same into one or more apartments of a building. Therefore I do not claim such, but a peculiar combination and arrangement of the smoke pipe, air heating chamber, hot air flue, and ventilating chamber.

I therefore claim the described arrangement of the ventilating chamber, G, with the main hot air flue, F, the smoke flue, B, and air heating chamber, A, the ventilating chamber and hot air flue, having valves applied to them, at specified, the whole being capable of being used in heating and ventilating the apartments or stories of a building.

RE-ISSUE.

PRINTING PRESSES—George P. Gordon, of New York City. Patent dated Aug. 5, 1854: I claim, first, a rotating reciprocating platen, operating substantially as described for the purpose specified.

Second, the arrangement of two slide arms so combined as to form a frame to carry the inking rollers both forward and backward over the form for each impression.

Third, throwing a vibrating bed from the point of its receiving the inking rollers, as described, directly to the impression, by means of toggles arranged as shown, or in an equivalent way, so that said bed after receiving the impression will be allowed to receive or fall back to its original position by its own gravity.

Fourth, the combination of the vibrating bed with the roller frame, composed substantially as set forth.

Fifth, the grooved cam shaped guides or their equivalents for throwing the frisket or its equivalent in the proper direction and holding it in the desired positions during the intervals of rest given to the platen for the purpose specified.

ADDITIONAL IMPROVEMENTS.

VENTILATING R. R. CARS—George F. Foote, of Buffalo, N. Y. Patent dated July 11, 1854: I claim a small door that may be opened or shut in connection with and as part of a car window, that may be raised or opened in the usual way, as described.

GRAIN BINDERS FOR HARVESTERS—George W. N. Yost, of Pittsburg, Pa. Patent dated Jan. 1st, 1856: I claim, first, the long lever, m, operated by projections, b2 b3, and spring, p, for the purposes set forth.

Second, I claim the arrangement and combination with the cams for operating the compresser, the lever, d, bevel gearing, j i i, and pulley wheel, e, on the pinion shaft, all arranged and operating for the purpose set forth.

Third, I claim the guards, t t, for the purposes substantially as set forth.

CONSTRUCTING WALLS AND FLOORS OF CELLARS—A. R. Moen, of New York City. Patent dated Feb. 26th, 1856: I claim the mode described of forming walls and floors by combining into one mass the water cement and asphaltum or its equivalent by means of the solid building materials as fully set forth, by which the asphaltum or its equivalent is caused perfectly to adhere to the bricks or stone of the wall built with a water cement, which also adheres to the same stone or brick as described.

DESIGNS.

CHANDELIERS—Samuel B. H. Vance, of New York City, assignor to Mitchell, Bailey & Co., of Connecticut. Two patents.

PARLOR STOVES—N. S. Vedder & Wm. L. Sanderson, (assignors to Sanders, Wolfe, & Warren,) of Troy, N. Y.

NOTE—Never were the inventors of our country more numerous and active than at the present time, as the above long list of patents issued last week evinces. The acting Commissioner, the Examiners, and in fact all the employees in the various departments of the Patent Office have, we apprehend, but little time unoccupied these days.

To forcibly illustrate the activity existing among our inventors at the present time we would state that during the month of March, just ended, the specifications and drawings of no less than one hundred and thirty-four applications were prepared at this office alone for American and European patents!—a larger number, we presume, than ever passed through a single Agency since the existence of a patent system in any country

In the above list we recognise the names of FIFTEEN patentees whose papers were prepared at this office—being about one-third the whole number—our usual average.

Extension of a Patent.

A petition has been presented to the Commissioner of Patents by J. N. and S. W. Lesh, Z. Beeson, and D. Bowman, administrators of J. Deardorff, deceased, of Wayne Co., Ind., praying for the extension of a patent granted them on June 27th, 1842, for a "Steam Generator." The petition will be heard at the Patent Office on Monday the 16th of June next, at noon, and persons who have any objections to the extension are notified to appear there and show cause why it should not be granted. Those opposing the extension are required to file their objections in the Patent Office twenty days before the day of hearing, and all testimony taken must be closed on the 6th of June and transmitted to the Commissioner.

Dressing Saws.

A correspondent informs us that the method pursued by him in dressing saws is to use an iron disk running at the rate of 2500 revolutions per minute for cutting the teeth, and then a small grindstone afterwards to dress and reduce them to the proper shape.

The wreck of the iron steamer *Curlew* on the rocks off Bermuda, as noticed by us last week, was due to the bad conduct of the Mate. Recent news from that place state that he kept no look-out. The water-tight compartment of the bow kept that part of the steamer above water until all got off the wreck.

Dangerous Hair Dyes.

Dr. Taylor states that oxyd of lead is extensively used for coloring the hair, which, combining with the sulphur in the hair, produces a dark color; and he had known a case where partial paralysis was caused, owing to the absorption of the oxyd of lead by the skin. When the hair dye was discontinued the effect ceased.

Vertical steam engine for sale; see advertising columns.

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Combined Steam and Ether Engines.

MESSRS. EDITORS—In the SCIENTIFIC AMERICAN of February 9th, you published an article relative to Ether Engines. You appear to distrust Du Tremblay's ether engine, because the Company has lately paid a dividend of 40 per cent.

Having resided here many years, and being quite aware of all that is taking place, I can give you correct information on this point. It is quite true that the Ether Co. has paid a fair dividend of 40 per cent., independently of a large reserve fund which has been laid by to meet eventualities; but this large profit is not wholly due to the use of Du Tremblay's ether engines. In the first place there have been such vast quantities of military stores transported from Marseilles to the Crimea, at such extravagant freights, that all steamboat companies have gained large profits; in the next place the Ether Co., were fortunate enough to meet with a steamboat builder who, miscalculating his estimates, sold them two 300 horse power vessels at about 20 per cent. under their real cost, and as the constructor was also beyond the time stipulated for their delivery, the Company took advantage of a penal clause in the contract to get about £7000 in cash out of the builder.

All these circumstances have tended to swell the dividends of the Compaay, but still the ether invention has largely contributed to the profits. Your readers will easily understand this on examining the principle of this invention. Du Tremblay's plan consists in a pair of engines conjoined; the first cylinder is worked by ordinary steam in the usual way. When the steam has exerted its mechanical effect, it escapes into a tubular condenser, enveloping the tubes in which ether is contained. Of course there is no communication between the interior and exterior of the tubes in the tubular condenser. The vapors of water and ether never mix. The ether absorbs the heat of the steam with great rapidity—the latter is condensed, while the former is converted into steam.

This ether-steam drives the second engine, and of course all the power generated by it is clear profit.

After the ether-steam has exerted its mechanical effect, it is reduced to a liquid state in a tubular condenser, which is cooled by passing among and around the tubes a large volume of cold water. To complete the operation, the condensed water is returned to the boiler, while the condensed ether is returned to its vaporizer; this vaporizer being at the same time the condenser of the water-steam.

As to the practical results, it is now about three years since the first trial of this system was made in the Mediterranean—a small boat of about 60 horse power was constructed, which has been navigating since then so much to the satisfaction of the Company, that they had two 300 horse steamers built, in 1853, and they have now on the stocks three vessels of 200 horse power, and two others of 420, all on the ether principle.

The ether cylinders of the boats now navigating, give about 60 per cent. of the power of the water-steam cylinder. So many improvements have been introduced in the last twelve months, that there is every reason to expect that the ether-cylinders will indicate a power equal to the water-cylinder, the saving of fuel then, would be exactly 50 per cent.

The waste of ether is almost zero—so little, that the smell even is scarcely perceptible in the engine room.

The boats navigating are the *Du Tremblay*, 65 horse power; *France*, 300; *Brazil*, 300. Those now building are the *Zouave*, 200 horse power; *Kabyle*, 200; *Sahel*, 200; *Ville de Lyon*, 420; *Amerique*, 420.

You have alluded to a patent taken out by H. G. Pecoul, of Paris, "for generating power in steam engines, by passing steam from the boiler through spiral copper tubes, which converts ether in a cylinder into vapor, and it then actuates the piston to give it motion."

No doubt this would work, but there would be no economy; the patentee would obtain in practice no more power than if he applied his water-steam directly on the piston. Theoretically there would be an economy of 9 per cent., because the specific heat of ether is 91, water being 100: but in practice he would lose *more* than he gained, by leakage, by inefficient vacuum, &c., besides uselessly introducing into his engine a highly volatile and inflammable ingredient. This was M. Du Tremblay's starting point about 15 years ago.

A SUBSCRIBER.

Marseilles, France, March 5, 1856.

[We are obliged to our correspondent for his information. We were positive that all the reputed profits of the Ether Engine Co., were not made by the superior economy of their engines; our correspondent's letter is confirmatory of our suspicions. It seems that the engineer who built engines for them made a miscalculation, and failed to meet his engagements at the time specified, and the managers of the Ether Co. profited, in this case, not by the saving of fuel in their engines, but by shaving the engineer. We have been of the opinion that the comparisons made between the combined ether engine and the simple steam engine, so favorable to the former—by its friends—have not been just to the latter. We cannot perceive how such a saving can be effected, as that described in the foregoing communication.

The way the great saving is stated to be accomplished in the combined ether engine, is by applying the heat of the exhaust steam to generate the vapor of ether, which is used to actuate a piston in an auxiliary engine. The ether coil forms an outside condenser for the steam engine; the condensed steam is employed to feed the boiler, and the condensed ether is employed over and over again, in the generator. The arrangement involves the expense of two engines in all their details, excepting a boiler for the ether one; and thus the expense for the machinery must be at least fifty per cent. greater than for a simple steam engine. The force of the ether vapor generated by the exhaust steam cannot be greater than that of the exhaust steam itself—this is the law; therefore it appears to us that the friends of the ether engine mistake a transfer of power by the heat of the exhaust steam for an increase of force. The exhaust of both the steam and ether cylinders must be greatly prolonged by the method of condensation, thus causing *back-lash*. A steam engine worked with high pressure steam, and the expansion principle carried out to its utmost limits, we think, will, on the whole, work as economically.

Falling Water—Form of the Orifice—Water Wheels.

MESSRS. EDITORS—Considering ourselves in some measure the cause of the publication of your recent articles on the power of falling water, now that they are finished, we desire to offer a few general remarks on the subject, not in a fault-finding disposition, but that we may be the means of communicating the results of our experience to others, when they can exercise their own judgment as to whether or not we are correct.

The question was, as we understand, the quantity of water which would pass through a turbine water wheel when in motion, with a given head and area of openings, but the calculations related to the quantity which would pass through the same size of aperture when at rest,—which we consider a very different matter. We are nearly agreed with the rules laid down in your articles, to calculate the power of a given qnantity of water passing in a given time, and under a given head, but the difference is in determining the *real* quantity of water which will fall in a given time, through a given sized opening, and if our experience is correct, the results as given in the articles, will, in all ordinary cases, be found to be altogether too high, for though we are aware that an aperture may be constructed which will pass 100 per cent. of its area, we know that one of the same size may be constructed, which, from its form and location, will not pass more water than 50 per cent. of its area. We have tested one wheel built on the re-action principle, and running in unlimited water, which, when at maximum speed, would pass 150 per cent. of its area, and we never tested one which did not pass as high as 125 per cent. of its area. The same wheels, while standing still, would pass from 80 to 90 per cent. of their area of openings. We find the Jonval wheel, built by us, with buckets well polished, will pass, when running, about 100 per cent. of the water; and when standing still, about 73 per cent. Again, we have tested others of the center discharge class, which, from the peculiar shape of the floats or buckets, would pass more by about 10 per cent., when still, than when running, (which at most did not exceed 90 to 95 per cent. of their area of openings.)

From these, and a long course of similar experiments, we have been led to the conclusion that no rule can be given which will be of general application, except we take into account the form and position of the aperture (whether in motion or at rest,) and the degree of contraction to which the fluid vein is subjected in passing through it. And the coefficient for the different shaped apertures, we think, can best be ascertained by allowing the same quantity of water which will pass through each, to flow over a notched board or weir, placed further down the stream, when the quantity, we think, may be very correctly ascertained by using tables taken from the results of experiments made in Scotland, and which were published in Vol. 6, SCIENTIFIC AMERICAN. We think the New York engineer mentioned by you was deceived by the party who told him that his 25 horse power engine performed the same work of a 70 horse power water wheel, and we could tell you of a similar case.

COLLINS & GILBERT.

Troy, N. Y.

[The rules in the articles referred to by our correspondents, had no reference to water passing through a turbine wheel at motion or rest. In them it is plainly stated that they are given, for water flowing out of a stationary orifice in a gate, or over a weir. All writers on hydraulics are agreed that the form of the opening has much to do with the quantity of water discharged in a given time. We did not suppose that the form of the openings and their position in wheels could make such a difference as that stated by our correspondents—ranging from 150 to 125 90·80 73 and 50 per cent. of discharge in the same area of openings.

Advice to Electrotypers.

MESSRS EDITORS—Supposing that any fact calculated to benefit the mechanic would be acceptable to you, I do not hesitate to inform you in relation to a discovery of mine, made several years since, and which I have repeated frequently, and can vouch for as perfectly successful. In plating articles by the electrotype process, you are aware that the articles to be plated are placed in a sort of wire basket, which is immersed in a solution composed of nitrate of silver, cyanide of potassium, bicarbonate of soda, or some other substances equally injurious. You are probably also acquainted with the fact that the operator frequently suffers very much from taking the articles from the bath, his hands becoming impregnated with the poison, causing them to inflame very much, burst open, and discharge an acrid humor, which excoriates the parts with which it comes in contact. The basket is attached to the negative pole of the battery, and consequently its contents, and the hand also, while in contact with the articles contained in the basket, become affected electro negatively, and consequently receive the poison into its tissues. To prevent this disease, platers are in the habit of anointing their hands with a pomade made for the purpose, or using an india rubber globe. The first of these quickly impairs the quality of the bath, and the other is somewhat inconvenient and troublesome. The plan adopted by myself is this:—If at the same instant the operator introduces his hand into the solution, he grasps an iron stirrup connected with the positive pole of the battery, the current will proceed from himself, and consequently his tissues will not absorb any of the poison. The stirrup must be surrounded with linen saturated with salt water. Long experience has made me familiar with this operation.

M. VERGNES.

New York.

Treating Timber to make it Durable.

MESSRS. EDITORS—I am not aware that the following is generally known, at all events it is not practiced in this locality. In Germany it is known and practiced extensively. The matter is this:—Hard wood, such as hickory, beach, dogwood, &c., is impregnated with the liquid of stable manure, and afterwards submitted to the influence of heat, and thoroughly dried, for the purpose of imparting to it good preservative qualities and rendering it tough and solid.

Wood intended for axe handles, mallets, &c., is steeped in this liquor for several days, and afterwards hung up over a fire and exposed to the influence of heat arising therefrom: two or three days is sufficient to render it thoroughly dry. It is then said to possess greater toughness and solidity than when subjected to any other process.

The farmers of Germany use mallets made of hard wood, which is prepared as above, for the purpose of driving iron wedges to split their timber; the wedges are usually made with a head about two inches or two and a half, and the mallet suffers no indentation from the percussion.

If the process imparts to the wood such qualities spoken of, the knowledge of the fact may be interesting and profitable. It is certainly a simple and convenient process, and some one may be disposed to test it, and compare its effects with those obtained by other methods.

GEORGE KILGOUR.

Cumberland, Md., April, 1856.

The Best Form of Sailing Vessels.

MESSRS. EDITORS—Out of a great number of experiments with different sized models the following was the most satisfactory: With a 20-inch model (2-inch beam) I tried the relative values of straight and curved floors, and I am constrained to believe that the latter is the best. With the straight floor and keel the model was drawn through still water 60 feet by a 7 lb. iron sinker—the line passing over a horizontal staff—in 10 seconds. The sinker was then changed for a four pound lead, which required 14 seconds to accomplish the same result. The model was then cut down to convex curves, and the length divided into sevenths; forward three-sevenths shaped to a curve whose circle would be 600 inches in circumference, and aftermost four-sevenths to the curve of a circle of 840—nearly a parabolic curve—that is, in a ship 200 feet long the curves from forward to *center of motion* and abaft that, would be respectively 1000 and 1400 feet radias. The model when so altered was drawn through the water by the 7 lb. sinker in 9 seconds—a gain of one-tenth—and by the 4 lb. sinker in 12 seconds—a gain of one-seventh The buoyancy of this floatant was incomparably superior to the straight keel.

INVESTIGATOR.

The Inventor of the Steam Fire Engine Boiler.

MESSRS. EDITORS—Be pleased to correct a mistake which you have made in regard to the inventor of the boiler used in the fire engine exhibited in the Park at New York last week, and oblige the real inventor,

THOMAS PROSSER, C. E.

Brooklyn, April 3d, 1856.

[We were informed that Mr. Lee was the inventor of the boiler in question, and made no *mistake* in stating this.

Useful Suggestion.

MESSRS. EDITORS—I have seen a circular saw, the shaft of which run in zinc boxes, and although exposed out doors, uncovered, for years, and frequently not used for months, it never was touched with rust—neither the saw nor its arbor. The zinc boxes generated an electric current, which prevented the iron from rusting. Might not the rails of railroads be prevented from rusting by being connected with zinc plates.

P. R.

Hannibal, N. Y.

To Prevent Ships Sinking at Sea.

Place vulcanized india rubber tubes of sufficient size in the hold and underneath the deck of a vessel, and if it becomes disabled and leaks let these tubes be inflated by a powerful air pump, and they will keep the vessel afloat.

J. TATE.

Mountain Island, N. C. 1856.

Prunes.

This fine fruit has been very successfully cultivated in Pennsylvania, by engrafting on plum trees. Prune trees have also been raised in Indiana.

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New Inventions.

A Hot Air Locomotive.

The hot air locomotive built at the Novelty Works, this city, for P. Bennet—as recently noticed by us on page 181—was tried on the 4th inst. on the Paterson Railroad, N. J., and accomplished the feat of running off the track. It is stated that when this happened it was running at the extraordinary speed of eighty miles per hour. This locomotive has cost $40,000, and weighs about 40 tuns. The hot air employed in it is moistened with steam generated in a small boiler. The hot air to be used in the cylinder passes directly through the fire and is mixed with carbonic acid gas.—Any engine impelled by such a motive agent, or rather agents, must soon destroy itself. In their very nature the hot air and gas (although somewhat mollified by steam) will act injuriously upon the metal.

Canal Across the Isthmus of Suez.

This great enterprise, which, for many years, has seemed a visionary project, is likely to be realized. The commission of engineers and scientific men whom the Viceroy of Egypt appointed to examine and determine upon the practicability of it, have made a report, in which they declare that the canal could be built on nearly a direct route from Suez to the Gulf of Pelusium, with a branch to the Nile. The estimated cost is $8,000,000, and the construction will take six years. It is estimated that this canal will effect a saving in distance between the respective places and Bombay, as follows: Constantinople, 12,900; Havre, 8,928; London, 8,550; Liverpool, 8,550; New York, 7,317; New Orleans, 8,178 miles. More than one half the distance is abridged between the principal ports of Europe and Asia, by the proposed canal. This single fact shows its immense utility to all nations, as well as to Egypt and Turkey.

The Steamer New Jersey.

It will be recollected by our readers that on the night of the 15th ult., the steamboat *New Jersey*—running as a ferry boat between Philadelphia and Camden, N. J., was consumed by fire, by which calamity 36 persons lost their lives. The citizens of Philadelphia have given this case a most thorough examination, and the Coroner's Jury have returned a verdict which places the whole blame of it upon the owners, and some of those employed on the steamboat—the captain, pilot, engineer, and fireman; also the Inspector. The boiler was worn out, leaky, and defective; the boat was inadequately manned, had no life-boats, life preservers, buckets, nor means of escape, from collisions or fire. We hope that those who have been blameable in this case, and whose bad conduct has been fully proved before the Coroner's Jury, will meet with the punishment they so justly deserve.

The Rensselaer Polytechnic Institute.

In our notice of the Pennsylvania Polytechnic Institute, a few weeks ago, we forgot to mention the above-named excellent Institute in Troy, N. Y., which was established in 1825 by the old Patroon, Hon. Stephen Van Rensselaer, and in which have been educated some of our most distinguished men in the walks of science. This institution is designed for the education of Architects, Civil, Mining, and Topographical Engineers, upon an enlarged basis, and with a liberal developement of mental and physical culture.

New Measuring Instrument.

Our engravings illustrate a convenient and ornamental little pocket instrument, for measuring surfaces of all descriptions, the invention of Mr. Louis Young, No. 1 Whitehall st., New York City, by whom it was patented Nov. 20, 1855.

One end of the instrument is held in the hand; the other end is furnished with a measuring wheel, which is rolled over the surface of the object to be measured, the distance traversed by the wheel being accurately indicated in feet, inches, and parts of inches on graduated disks. Fig. 1 shows an exterior view of the improvement, A being the measuring wheel; B is a pointer, which shows the inches and fractions, while the number of feet are seen through the aperture at C. Referring to fig. 2—which exhibits the interior construction—it will be seen that wheel A is furnished at its center with a cam, D; the latter has a connecting rod, E, extending to the slide, F; this slide has a pawl, G, which moves the ratchet wheel, H; the numbered disk, I, moves

IMPROVED MEASURING INSTRUMENT.

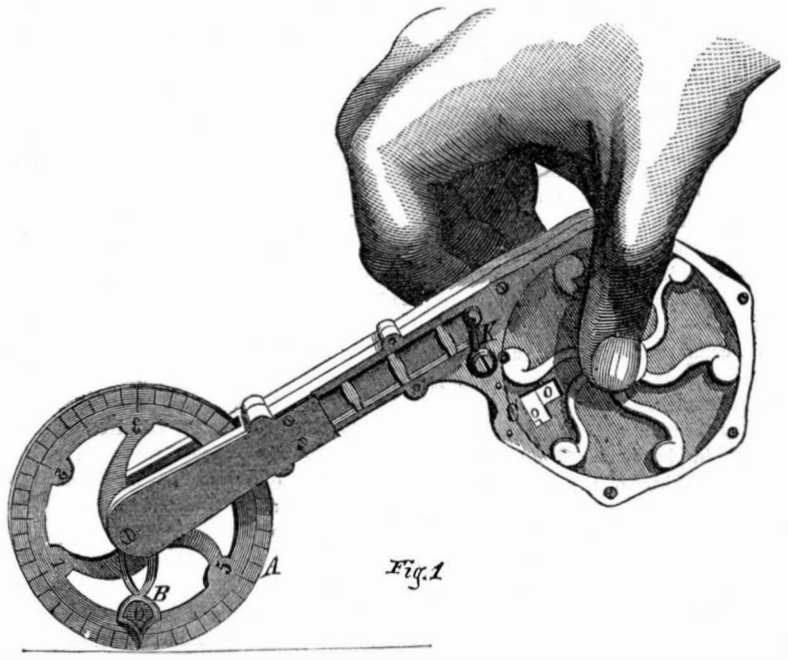


Fig. 1

up. The saving of time and trouble over the ordinary method of measurement by tape or rule is obvious.

In the center of disk I there is a coil spring J, which returns the disk to zero, ready for a new measurement. The spring is brought in-

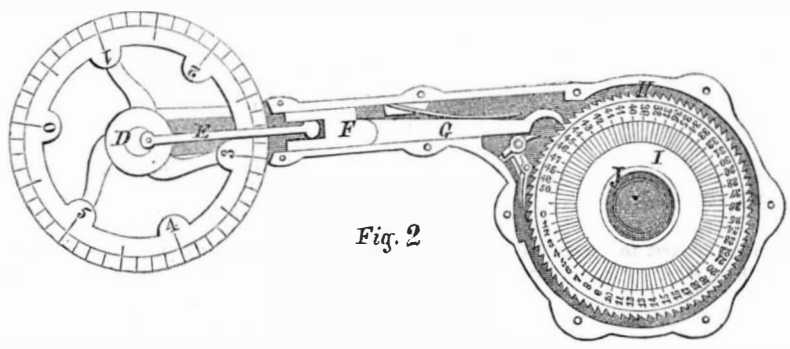
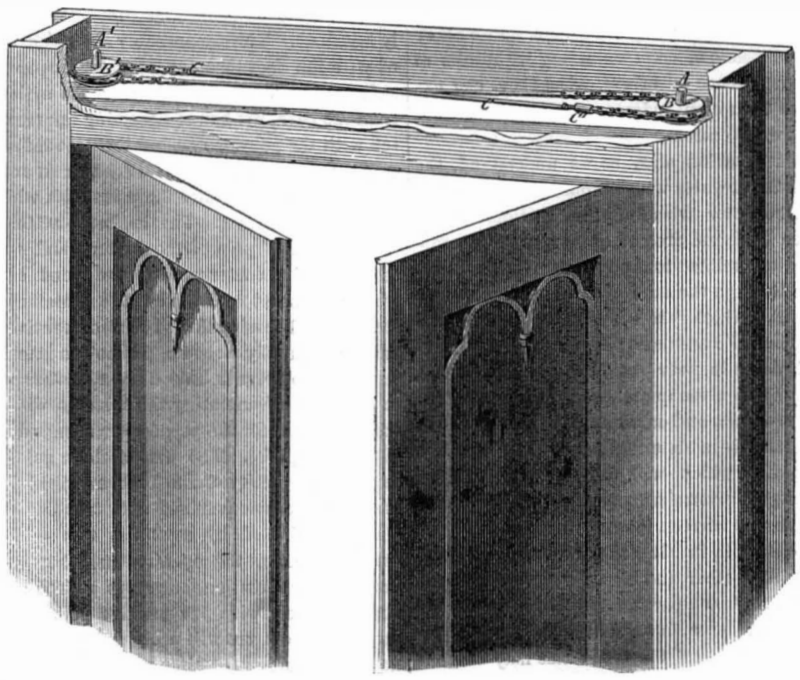


Fig. 2

with H. At every revolution of wheel A, the pawl, G, will push against the teeth of ratchet wheel, H, move it one cog, and thus exhibit a different figure at the aperture in the handle C. To take the measure of any surface, therefore, it is only necessary to roll the wheel, A, over the same, when a correct answer will be seen on the instrument, mechanically figured to operation by touching the button, K, on the handle.

The instrument may be so made as to measure from one up to one thousand feet or more continuously. The expense of manufacture is quite small. The disks, which require mathematical accuracy in their construction are all produced by unerring machinery. Surveyors' instruments and many other varieties of measures can be constructed on this plan. It is a very excellent and useful improvement. Apply to the patentee for further information.

NEW METHOD OF CONNECTING DOORS.



Improved Method of Connecting Doors.

This improvement consists in providing double doors with spindles, A A′, which extend up through the jamb into the casing; pulleys, B B′, are attached to the spindles; a chain belt and connecting rods, C, unite the two pulleys, so that when one door is opened, the other will also be moved; the inconvenience of having to open both doors by hand is thus avoided. The rods have an adjusting nut, C′.

In our engraving the belt is crossed, so that both doors will open in the same direction By changing the belt, so that it will work in direct lines, the doors will open in different directions. If desired, a spring may be attached to the spindles above the pulleys, which will, at all times, close the doors.

The parts are simple, strong, and wholly concealed in the casing from view.

For offices, stores, shops, cabins, state rooms, and all situations where double doors are required, this invention presents special advantages. Its cheapness and simplicity are strong recommendations.

Mr. Charles E. Brown, formerly of New York City, now of East Cambridge, Mass., is the inventor. His patent bears date January 8, 1856. For further information apply to Mr. D. M. Devoe, 178 Wooster street, New York City.

Launch of the Steamship Adriatic.

This noble vessel was launched from the ship yard of her builder, George Steers, on the forenoon of the 7th inst., amid a vast concourse of persons who had assembled to witness the scene. At half-past eleven o'clock the booming gun told the hour for the last wedge to be struck away, when instantly the leviathan hull began to move on her ways, and quicker and quicker, onward she bounded majestically into the "briny deep." The impetus she received carried her to the other side of the river, and led to the demolishing of one of the piers, but the *Adriatic* sustained no injury.

The model of this steamer is the same as that of the *Niagara*. Her entrance is sharp and beautiful, and all her lines very graceful and fine. Her length is 354 feet, breadth 50, depth 33, tunnage 5250 tuns. Her engines are to be oscillators, the largest of this character ever constructed. Their bore is to be 96 inches, their stroke 144 inches. They are now in course of construction at the Novelty Works of Messrs. Stillman & Allen. They are to be fitted up with Mr. Allen's new valve arrangement, and are to be splendid specimens of engineering. The hull is divided into a number of water-tight compartments, and no expense will be spared to make her the finest and as safe a steamer as plows the deep. Her interior arrangements will be on a grand and costly scale, and her whole cost, it is estimated, will not be much less than $850,000.

The *Persia*—the latest built ship of the Cunard line—is 360 feet long, or six feet more than the *Adriatic*, but she is five feet less in width, and in burden is less by 600 tuns.

The *Vanderbilt*, the *Persia*, and the *Adriatic*, the new great Atlantic steamers, will be representatives of different classes of engine propulsion. The *Persia* is fitted with side levers, the *Vanderbilt* is getting in over-head beam engines, and the *Adriatic* will have oscillators. The latter kind of engines are the most simple and compact, but hitherto they have been objected to for large vessels on account of their steam heated trunnions. The engines of the *Vanderbilt* are now being rapidly fitted up at the dock of the Allaire Works. Her cylinders are of 90 inches bore, with a stroke 144 inches; the estimated power of them is less than those designed for the *Adriatic*. The *Persia's* cylinders are 100 inches in diameter; their stroke is ten feet.

The fitting up of these large vessels with steam engines so different in their construction and arrangement affords us much satisfaction, inasmuch as their experience will be a great addition to the science of marine engineering.

Mechanics Festival.

We learn by the *Weekly Banner*, of Hamilton, C. W., that the mechanics of that place belonging to the Mechanics Institute, held their Annual Festival on the 2nd inst., and had a fine time of it, between eating and speechifying. The President, Nehemiah Ford, stated that the success of the Institute during the past year, had been unparalleled. There had been an increase of 200 members, and its financial affairs were in a flattering conditon. The success of the Institute does honor to the mechanics of Hamilton. It has a good library, owes no debt, and has a large list of members, who are careful readers of the Scientific American.

To Major Raines and Lieutenant Churchill we are indebted for courtesies tendered us, while spending a few hours on Governor's Island last week.

Chilled rolls of the very best quality can be procured of the Birmingham Iron Foundry. See their advertisement in another column.

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Scientific American.

NEW-YORK, APRIL 19, 1856.

The Architecture of Cast Iron.

We have before us, in an illustrated and a well written pamphlet by John W. Thomson, A. M., of this city, an account of the origin, application, and advantages of cast iron in the construction of buildings. No city in the world is undergoing such an architectural transformation, at present, as New York, and cast iron is a powerful agent in this revolutionary work. In one single street ten handsome houses—some of brick and some of stone—which a few years ago were used as the mansions of wealthy citizens, are now being taken down, and on their sites are to be erected ten structures for stores, with ornamental cast-iron fronts. Designed upon one plan, and placed close together they will resemble a single harmonious, stately, and imposing edifice. The "happy adaptation of cast-iron to ornamental architecture," no man can doubt for a moment, after viewing the majestic pile of Messrs. Harper, in Pearl street, and other cast-iron buildings which have been erected during the past few years in New York, and other American cities. The value of cast-iron as a plastic and stable material for building, is now being appreciated; and in a few years hence, so many beautiful buildings of it will be put up in our cities, as will make them far surpass, in architectural effect, the most famous cities of the old world.

The origin of cast-iron buildings is due to James Bogardus, of this city. The pamphlet informs us, that it was while contemplating the rich architectural designs of antiquity in Rome and Florence, in 1840, that he conceived the idea of emulating them in his native country by the aid of cast-iron. When he returned, some years afterwards, he devoted his attention to the subject, and in 1848 commenced to build his factory on the corner of Center and Duane streets, which we are informed was the *first* entire cast iron edifice ever erected. The inventor met with much to try his patience, and to discourage him during the time it was building. There was a general prejudice, amongst all classes, and peculiarly so among most men of science, against the use of metal as a building material. It was believed that by the changes of atmospheric temperature, it would expand and contract so frequently, that a building made of it would soon become loose in its joints, buckle in its several parts, and become unstable and unsafe. Experience has proven such notions to be unsound and erroneous. The atmospheric changes of temperature exercise no appreciable effect upon such structures.

The pamphlet states that not a single joint in Mr. Bogardus' factory has ever moved an hair's breadth, although a powerful steam engine, is kept at work on one of the floors, and heavy machinery kept in operation on all the others. To us it appears that such cast-iron buildings must be more stable than those of granite, stone or brick, the numerous joints of which are only united by a feeble bond of mortar, whereas, the whole of the joints of these cast-iron structures, are turned true in a lathe to fit accurately, and then they are all screwed together, thus making a cast-iron building as strong as if it were one entire casting.

It may justly be asserted that cast iron has already been the means of originating new styles of architecture, and we may be pardoned for indulging in a feeling of national pride, because of its American origin. In brick, stone, marble, and granite, the finest modern structures are but feeble imitations of the old masters; and as Ruskin has placed metal as a building material, beyond the pale of conservative architecture, we may justly claim cast-iron building as the only new architectural art which modern genius has devised. Hitherto its use has been chiefly confined to factories, stores, lighthouses, and towers, but we hope the day is not far distant when churches, spires, mansions, and cottages will be constructed of it.

A single ornament for a building may be as cheaply executed in marble or free-stone, but when a multiplicity of such is required, they can be cast in iron at an expense not to be named in comparison with like ornaments in wood or stone, and with this advantage they will always retain their original fullness and sharpness of outline. The pamphlet referred to contains some very beautiful and chaste ideas on this point, which we cannot do better than close this article with:—

"Fluted columns and Corinthian capitals, the most elaborate carvings, and the richest designs, the architect may have dreamed of, may be re-produced in iron for little more than the cost of ordinary castings. Ornamental architecture, which, with limited means, is apt to be tawdry, because incomplete, thus becomes practicable, and its general introduction would tend to elevate the public taste for the beautiful, and at the same time gratify one of the finest qualities of the human mind."

Recent American Patents.

Sifting Apparatus—By Samuel Harris, of Springfield, Mass.—Consists in providing the cover of the sifting box with a series of pins, which, when shut down, project into the sieve and come in contact with the substance to be sifted. When the sieve is moved back and forth the pins serve to stir up the substance and separate particles that adhere, and thus ensure thorough sifting. For spices and many other articles this plan is admirable. The sieve is moved by a crank and rod.

New Method of Arranging Steam Propellers—By Aaron Arnold, of Troy, N. Y.—The inventor provides two extra keels, running along on the bottom of the vessel, one on each side of the central keel. A propeller is attached to the end of each extra keel. The keels are bored to accommodate the propeller shafts, and, if desired, a propeller may be placed at both ends of each shaft. Located on the bottom of the vessel where the water is more solid and unbroken by the passage of the ship the propellers are expected to act with greater effect than when placed at the stern in the common manner.

Driggs' Improvements in Pianofortes.—This invention, described and illustrated in the last number of our paper, was patented in the United States Dec. 18th, 1855. It has also been patented in Great Britain and France through the Scientific American Agency.

Machine for Mixing Mortar—By Henry W. Hunt, of Peekskill, N. Y., and John Sands, of Greenwich, Conn.—The lime and sand are spread out on a circular platform on which traverses a large wheel, while behind follows a couple of scrapers, placed at different angles. Riding on the scrapers is a vessel from which water is allowed to drip upon the lime and sand, so as to impart the necessary consistency. The action of the wheel is to spread out the mortar, but the scrapers immediately throw it up again into a continuous heap. The mortar is thus very quickly and intimately mixed. At a suitable part of the platform there is a trap door through which the mortar falls, in a heap, when duly prepared.

Improvement in Slate Frames.—By Edwin Young, of Philadelphia, Pa.—Slate frames are generally made of four pieces of wood, dovetailed and pinned together at their corners. In this improvement only one piece of wood is used, which, after being grooved to receive the slate, is bound around the same like a hoop and fastened. Slates thus formed may be made in oval form, the framing consisting of rattan or other light handsome wood. They are rendered much more convenient to handle, are more durable, as the frame cannot easily give out, will not brake on falling, are cheaper, &c. This is an excellent improvement.

Fastenings of Folding Doors and Windows—By G. H. Lindner, of Hoboken, N. J.—Where folding doors are used it is necessary, for security, that one of them shall be firmly fastened, independent of the other; this is generally done by means of bolts at the top and bottom; to fasten and unfasten these bolts is inconvenient. In the present improvement a new kind of self-acting latch is used which takes the place of the bolts, so that by the mere act of closing the two doors one or them will be secured at the top and bottom as before

Tidal Flood Gates—By George W. Flanders, of Lynn, Mass.—On many parts of the sea coast the rise and fall of tide water is employed to drive grist and other mills. For this purpose a dam is generally thrown across a creek, a sluice way being left in the middle. The sluice is furnished inside the dam with a hinged gate, so that when the tide rises it pushes up the gate and rushes into the enclosure formed by the dam. When the tide begins to fall and the current changes the water closes the gate; the fall thus obtained is employed to turn a wheel until the tide rises again. The gate is generally hinged at the top and passes across the top of the sluice, so that navigation is wholly cut off. The present improvement consists in hinging the gate at the bottom, so that it may be made to turn down level with the ground either by force or by the incoming of the tide, thus leaving the sluice open for vessels to pass through.

Universal Lathe Chuck—By Michael Neckerman, of Pittsburg, Pa.—The design of the inventor of this improvement is to permit the centering of an object in lathe, either on its true center or eccentrically, as may be desired, without inconvenience. Most chucks are so arranged that the article cannot be centered eccentrically without taking the chuck apart to alter the position of the jaws; after use the chuck must be again taken to pieces to restore the parts. In the present invention there is an ingenious arrangement, whereby the chuck may be instantly altered to hold the object eccentrically or otherwise, at pleasure. It is a good improvement.

Pressure Tea Bell—By Jason Barton, of Middle Haddam, Conn.—Ornamental tea bells of the gong shape, operated by pushing down a button, are extensively sold. In these the hammer is connected with a spring and escapement. In the present improvement, which is of the same form and class, the button is attached to one end of a lever within the bell and the hammer to the other; the fulcrum of the lever is placed quite near to the point where the button connects, so that the opposite or hammer end of the lever, when the button is pressed, will have a larger sweep than the other end, and strike the bell. The improvement cheapens this kind of bell considerably, and renders it more durable, as the spring and escapement are wholly dispensed with.

Fire Regulator for Steam Boilers—By Wm. S. Gale, of New York City—This improvement relates to a method of regulating the draft damper of steam boilers, so as to increase or diminish the fire according to the pressure of the steam. When the pressure exceeds a given weight the apparatus shuts the damper and slacks down the fire; and when there is not steam enough the damper is opened so as to quicken the fire. These contrivances are coming into very extensive use. They effect an important economy in fuel by assisting to maintain a steady fire in the furnace.

Most of the apparatuses of this kind consist of a lever attached at one end to the fire damper, and at the other to a piston, which rises and falls according to the pressure of steam.

The present improvement consists in giving the interior of the piston cylinder a slightly conical or taper form for the purpose of allowing the piston to fit easily within it while the damper is open, so as to be very sensitive to any increase of pressure, but to increase the friction of the piston as it is lifted by an increasing pressure of the steam, thereby causing the damper to check the draft quickly at first and then more gradually, instead of entirely closing it with a sudden movement as in other regulators. Another portion of the improvement relates to the construction of the piston.

Improved Washboard.—By Royal Hatch, assignor to H. C. Hatch, of Strafford, Vt.—The washboard is composed of beaded rounds placed together lengthwise in a frame, the beads of one round fitting into the spaces between the beads of the next round, so that a perfect corrugated surface is obtained for the clothes to be rubbed over. The water will pass through the rounds, but the suds will be retained, spattering will be prevented, &c.

Machine for Polishing Buckles—By Robert G. Pine, of Sing Sing, N. Y.—Consists in securing the buckles or other articles in clamps attached to rotating shafts, which work in yielding or elastic bearings, said shafts being placed at each side of a polishing wheel and guide wheels so that the articles to be polished will be properly presented to the polishing wheel. The shafts while rotating are moved longitudinally, so that the whole surface of the work will be presented to the polishing surface. The polishing is done quickly and in a very thorough manner.

Improvement in Shot Guns—By Buckel and Dorsch, of Munroe, Mich.—This invention consists in giving the barrel of the gun a slightly undulating form, for the purpose of causing all the shot to strike within a certain circle, and prevent its indiscriminate scattering. The barrel is divided into an odd number of parts, say five, seven, or nine, according to the length, the said parts being made alternately of larger and smaller diameter. The parts next the breech and at the muzzle are of the larger diameter, and the intervening parts smaller and larger alternately, thus producing an undulating bore. Many experiments, we are told, have been made with shot guns of this construction, and the result in all cases is, that the shot fall within and evenly cover a certain sized circle, never scattering beyond. Such guns must be far more effective for sporting purposes than the ordinary kind.

Improved Safe Lock—By William Maurer, of New York City—The invention consists in an ingenious construction and arrangement of a series of thimbles, bolt catch, and bit. This lock is believed to present perfect security against burglary, while the expense of manufacture is quite small.

Recent Foreign Inventions.

Cure for Cholera, Dysentery, &c.—T. Sleight, of Hull, England, has obtained a patent for the following compound to cure bowel complaints: Essential oil of cassia, peppermint cloves, and nutmeg, (about an ounce each) are added to spirits of wine (a pint) and when intimately mixed, about an ounce of ground apple of the *pinus picea*, or silver fir tree, is also added. A little of the tincture of opium is also added, and the compound is complete. It is given in very small doses, and the smaller the better we opine. No patents for medicines have been granted for a long period by our Patent Office; but in our notes on "Curious American Inventions" we shall present some which will throw the above one entirely in the shade.

Water Gas—W. H. Lancaster and J. Smith, of Liverpool, patentees.—This invention embraces the introduction of water into the common coal gas retort during the process of distillation, whereby the water is decomposed and its hydrogen given off with the carbon and hydrogen of the coal. The claim is for the simultaneous decomposition of water and coal n one retort.

New Lubricating Compound for Railway Axles, &c.—G. Durham and C. Wyatt, of London, patentees.—Take 24 parts of tallow, 12 parts of common soap, and 2 parts (all by weight) of resin, and mix them with warm water. The tallow, soap, and resin may be heated and rendered fluid before they are placed in the hot water. The compound is stirred until quite cool. Some of our engineers should make some experiments with this lubricator.

Compound for Feeding Horses and Cattle.—The patentee of the following great interior invigorator is A. C. Morrison, of London—a relative, perhaps, of the renowned Dr. Pill Morrison. It consists of kidney beans, oats, barley, rice, linseed, liquorice, niter, carraway, Peruvian bark, galingal, gentian, sulphur, salt, resin, cream of tartar, carbonate of soda, grains of paradise, ginger root, Iceland moss, arrow root, aniseed, cardamus, turmeric, cascarilla bark, canella, alba, and guacum. These are mixed together, in various proportions, to feed the animals, and is stated to be an improvement on the feed compound patented by G. W. Henri, Jan. 30, 1855.

This receipt surpasses the one of Sam Slick for feeding his horses on pine shavings by mounting them, at meal times, with green spectacles. Sam's, however, has the merit of

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being short, dry, and cute; while this one of Morrison is long, soft, and kinky.

Cannon—J. C. Haddan, of "Cannon Row," London, patentee.—This invention consists in lining the interior of old and new cannon with rifled or plain tubes to fit the bore. They are inserted into the cannon after it is cast, and are made in one, two, or more pieces, longitudinally or transversely. Such tubes for cannon are intended to be renewed from time to time as they wear out, so that the body of the cannon may serve for a long period, and not as they are constructed at present, the whole gun having to be laid aside as useless on account of the worn bore.

The above-named place, where the inventor of this improvement resides, harmonizes with the character of his invention.

Silver and its Uses.—Concluded.

A great quantity of silver is used for articles of domestic use among the more wealthy classes; but although such articles pass under the name of "silver plate," they are all alloyed more or less with copper. In our country there is a great difference in the quality of articles which pass for silver, owing to their degrees of alloy. In England, on the other hand, there is a standard for plate silver, and in order to prevent fraud, all silver vessels are required to be inspected and stamped. The alloy is composed of 111 parts silver to 9 of copper, by weight. In France, the standard for plate is 19 parts silver to 1 of copper. The addition of a small quantity of copper to silver, while it increases its hardness to a wonderful degree, scarcely diminishes its whiteness. The greatest degree of hardness is obtained by using of copper one-fifth the weight of the silver. With equal weights—copper and silver—the alloy is a good white. Articles formed of alloyed silver are subjected to a process to remove the baser metal from the surface. They are heated nearly to redness, then plunged while hot into warm water acidulated with sulphuric acid, which removes the oxyd of copper (formed while heating the article) from the surface, leaving it of a blanched appearance, called *dead silver*. Alloyed silver articles are sometimes boiled in bi-sulphate of potash to produce a like effect. Those parts of plate requiring to be burnished are polished with proper tools.

The most important salt of silver is the "nitrate;" it is prepared by dissolving silver in nitric acid, and evaporating the solution to dryness, or until it is sufficiently concentrated to crystalize on cooling. The crystals are colorless and transparent, readily soluble in water and alcohol. If these crystals be heated in a crucible, they fuse like niter, and are formed into sticks, called *lunar caustic*. This salt blackens by exposure to the sun. Ivory, marble, &c., may be stained black by soaking them in a solution of this salt, and exposing them to the sun's rays. It is used for making indelible writing ink. The article to be marked, is first moistened with carbonate of soda, then dried, then written upon with a weak solution of the nitrate, and exposed to the sun; it soon assumes a black appearance. It is also much employed for dyeing the hair of those who wish to conceal the marks of age. A weak solution of it applied to the hair, is all that is required to color it black, or deep brown. Care must be exercised not to touch the skin with it. The cyanide of potassium will remove nitrate of silver stains.

When nitrate of silver is taken as a medicine, it gives to those parts of the body exposed to the light, a leaden gray color. In a weak solution, it is used by some oculists as a wash for inflamed eyes, but it should be avoided if possible, as it greatly discolors the white part of the eye. A weak solution of it is often applied by physicians for curing diseases of the throat.

The nitrate of silver is much used in preparing daguerreotype plates, and photographic paper; it plays an important part in sun painting. Its sensitiveness to light, and other substances, is the reason of this. A plate of clean copper introduced into a solution of it, produces a brilliant crystaline deposit of silver; a stick of phosphorus placed in it soon becomes encrusted with tree-like crystals of the metal. Mercury poured into a solution of it produces that beautiful crystaline deposit of the metal known by the name of *arbor Dianæ*.

The chloride of silver is formed by mixing together a solution of nitrate of silver with a solution of common salt; it is termed *horn silver* when found native. This salt is soluble in ammonia, and in a solution of the cyanide of potassium; it is much used in photography. By introducing a solution of potash or soda into one of nitrate of silver, a protoxyd is formed; it falls to the bottom of the vessel in the form of an olive colored powder. If this be digested in a strong solution of ammonia, a black substance is produced, which is terribly explosive—fulminating silver. It explodes under water when heated to 212°, and when it is dry, the touch of a feather, or the rolling of a carriage across the street explodes it. Fulminating silver is also obtained by the action of warm alcohol on nitrate of silver. The iodide of silver is formed by adding nitrate of silver to the iodide of potassium. It is easily decomposed by light, and it therefore forms the basis of the film of photographic pictures. Silver solder is composed of 667 parts of silver, 233 of copper, and 100 of zinc.

Silver was early applied to the purposes of ornamenting by plating, that is, covering an inferior metal, like copper, brass, and iron, with a skin or coating of silver. The articles to be plated were scoured bright, then heated to a point just below that at which the metal changes color, the silver in thin leaves then laid on and the adhesion produced by a burnisher.

The best method of fire silver plating is that pursued in Sheffield and Birmingham, England, which is to make plated ingots, and from them manufacture the articles. Ingots of copper or brass are carefully filed, then the silver in thin sheets is neatly laid on them, their edges joined together and brushed with a solution of borax. They are then tied with wire and introduced into a furnace heated with charcoal. The ingots are laid on the red-hot charcoal and submitted to heat until the silver is observed to draw into the copper. The attendant who watches the process now withdraws the ingots, for if suffered to remain longer the silver would become amalgamated with the copper. Although electro-silver plating has recently become so common we have been assured that the business of fire-silver plating has in no wise diminished.

Electro-silver plating is now carried on to a great extent. The silver is deposited from a solution of the argento-cyanide of potassium on the articles to be plated by a galvanic current generated in a battery. White metal, or a composition of tin and copper, is the best basis for silver plating, because when the plating wears off, the white metal underneath is not so readily noticed. Electro silver plating is an art only a few years old, yet owing to its flexible character—the facility with which so many articles can be covered with a coat of this beautiful metal—it is the most interesting of all others for which silver is used

Notes on Ancient and Curious Inventions.—No. 3.

Linen and Duck—Previous to the invention of the cotton gin, and while cotton was a dear material, linen was most generally employed for all the purposes of domestic and personal use, now fulfilled by cotton cloth. The manufacture of linen was therefore sought to be early encouraged in the Colonies, and a Bill was introduced into the Connecticut Legislature in 1735, to pay a bounty on every yard of fine linen made. The bill, however, was not passed, and to this day no *fine* linen has yet been made in America. In 1724, Richard Rogers, of New London, Conn., manufactured excellent duck for sails, and obtained a patent for its exclusive manufacture in the year following.

Silk, Flax, and Hemp.—The Legislature of Connecticut early offered encouragement to those who would cultivate hemp and flax, and raise silk. In 1784 a bounty was offered for every ounce of silk raised from cocoons.

Pins.—As early as 1775, a factory for manufacturing pins was proposed to be erected at Wethersfield, Conn., by Leonardus Chester, but until 1812—during the last war with England—our country received all its pins from across the Atlantic. In that year their price rose to one dollar per paper, when some pin makers came to New York from England, and commenced business, at which they continued until the war ceased, when they abandoned it. The first patent for manufacturing pins by machinery was obtained by L. Morse, of Boston, in 1813. The *solid* headed pin, the one now in common use, which has entirely superseded the old separate headed pin, was invented by Lemuel W. Wright, of Haverhill, N. H. He obtained patents for America and England, in 1825, and went to the latter country to sell and introduce his machinery for their manufacture. A working machine was in operation in 1826, in London, and the inventor made and sent out two machines to his own country, but these were never set in operation. His machines were defective in forming the pin points, owing to the difficulty of arranging and keeping the rotary files in order for this purpose, consequently his machines were, at last, only employed to take the wire from a reel, straighten, cut it into lengths, then head and deliver it to be pointed by hand. This inventor, like J. Perkins, took up his residence in England, where he was living three years ago, and was highly esteemed for his mechanical genius and integrity. The names of the inventors of the steam engine, cotton gin, steamboat, and telegraph, are often mentioned with enthusiasm and respect, because of the benefits they have conferred upon mankind by their inventions, but who ever heard of the name of Lemuel W. Wright, of the Old Granite State being toasted as an inventor, and yet his invention was a most useful, and ingenious one. Like many other good inventions, however, the authorship of the solid-headed pin is disputed. On page 381, Vol. 9, Scientific American, there is a notice of the solid-headed pin having been made fifty years ago by D. F. Taylor, of Birmingham, Eng., whose brother now manufacturers them at the rate of 200 per minute. In 1832 a patent was granted to John J. Howe, for a pin machine, and in 1835 a Company was formed in this city to carry on the manufacture under his patent. The machine formed the head of a coil of fine wire by dies, and the pin so made did not differ from the English diamond pin. In the same year Samuel Slocum, of Rhode Island, obtained a patent in England for machinery to make solid-headed pins, and in 1838 a factory for their manufactory was set in operation at Poughkeepsie, N. Y.; he did not obtain an American patent; the machinery was operated in secret. In 1838, J. Howe also obtained a patent on improved machinery for making solid-headed pins, and the "Howe Pin Manufacturing Co." at Birmingham, Conn., are now making pins by his machine. "The American Pin Manufacturing Co.," of Waterbury, Conn., bought out Slocum's machine, at Poughkeepsie, in 1848. The weekly manufacture of pins by these two companies amounts to about 9 tuns. At one time all the pins were inserted into their papers by hand, but machinery has been employed for a number of years to execute this work, so that from first to last, the manufacture of pins, as at present conducted—from the wire until they are ready for market—is performed by self-acting machinery. The American improvements in pin making, and sticking the pins, have been in use for several years, we understand, in England.

Railroads; Speed: Grades, and Curves.

We are indebted to the Superintendent—D. C. McCallum, Esq., for a copy of a very complete report of the New York and Erie Railroad for 1855. There are some matters of a scientific nature in this report, a brief review of which will be interesting to a number of our readers.

The whole length of track—including double and branch tracks—belonging to the Company, is 769 miles; and the tracks are 6 feet gauge. It is a stupendous railroad, involving the use of an immense amount of property, and employing a vast number of persons; therefore, as it does a great amount of business, its affairs require to be managed with great circumspection.

Speed—In the transaction of a passenger traffic great speed forms an important item of cost. The expense of running a train is stated to be increased nearly as the square of the speed. Delays and accidents are the attendants of high speeds The report says:—

"When the time-table is so arranged as to call for speed nearly equal to the full capacity of the engine, it is very obvious that the risks of failure in making time, must be much greater than at reduced rates, and when they do occur, the efforts made to gain time must be correspondingly greater and uncertain. A train whose prescribed rate of speed is thirty miles per hour, having lost five minutes of time, and being required to gain it, in order to meet and pass an opposing train at a station ten miles distant, must necessarily increase its speed to forty miles an hour; and a train whose rate of speed is 40 miles per hour, under similar circumstances, must increase its speed to 60 miles per hour."

The liability to collisions on a single track, with high speeds, are thus clearly set forth, and moderate speeds are recommended.

The Telegraph—It is stated, in the report, that a single track railroad may be rendered more safe and efficient by a proper use of the telegraph, than a double track railroad without its aid. The double track obviates collisions on trains moving in opposite directions, but not in the same direction; and it is asserted to be a well established fact, that collisions between trains moving in the *same direction*, "have proved by far the most fatal and disastrous." *We* have always entertained a different opinion to this. Mr. McCallum asserts that a single track, with proper turnouts, and the use of the telegraph, is a more safe and profitable investment than a double track without a telegraph. "In the moving of trains by telegraph, nothing is left to chance." Those railroads, therefore, which do not use the telegraph, exhibit a great want of sagacity and good management.

Resistance of Grades and Curves—The report also contains an account of a series of experiments for determining the effect of resistance of grades and curves. These took place in the month of September last, and were made with a view to determine the relative power required upon the several Divisions of the road for the transportation of heavy freight.

A single locomotive was run the entire distance from Dunkirk to Piermont with trains varying to suit the ruling grades of the different divisions. The engine selected for this purpose weighed 40,050 lbs. on the driving wheels, it had cylinders of 17-inch bore and 24 inches stroke; driving wheels 5 feet in diameter, and an effective steam pressure of 125 lbs. on the square inch.

The traction of the engine was 14,485 lbs., that is, the total resistance it could overcome with steam at the above pressure; its friction without load was 347 lbs. It has been customary to estimate the friction of cars on 30-inch. wheels with journals 3 inches in diameter at 7 lbs. per tun, but the experiments demonstrated this to be too high. The friction of such cars was demonstrated to be only 4 1-2 lbs. per 2000 lbs., the resistance of curves 1-2 lb. per tun per degree of curvature the 100 feet. The adhesion of the engine was 36 per cent. of the insistant weight; this has heretofore been estimated to be from 12 1-2 to 25 per cent. A train consisting of 100 loaded cars, weighing totally 1765 tuns was taken over a mile of road on an ascent of 6. 14 feet, and a curve of 1° 5730 feet radius in 11 1-2 minutes.

The following were the resistances overcome. Friction of engine and tender 347 lbs., cars at 4 1-2 lbs. per tun, 7702 lbs., gravity of engine and train 4104 lbs. Resistance of curve 882 lbs., and additional friction 1410, making a total of 14,445 lbs., or 40 lbs. less than the estimated traction of the engine. On a grade of 60 1-2 feet ascending and a curve of 5° 1146 feet radius, with a train of 429 tuns total weight the resistance was 14,363 lbs., or only 82 lbs. less, while the load drawn was less than a fourth of that on the low 6 feet grade and the one degree curve. This was done in six minutes and a half, but it shows the great amount of power consumed in ascending inclines, because the whole train, as it were, takes as much power as would lift its entire weight to that hight—60 1-2 feet in the second example. No experiments were made test the increase of resistance with an increase of speed, but it is very evident that the Superintendent is of opinion that, with the exception perhaps of friction, they increase according to the square of the speed.

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TO CORRESPONDENTS.

H. C. C., of Iowa.—We like the soldered tin roofs best; they are said to be more durable. Red lead is the best paint for such roofs, It is easier to put on a lock roof, with white lead in the seams, than to put on a soldered roof. The pitch should not be less than an inch to the foot. In Iowa a tin roof may last for ten or twenty years without paint, but in New York, subject to sea breezes, it would last but about three years, We do not know the character of the heater mentioned by you.

J. W., of Ohio—If you dissolve some shreds of india rubber in warm turpentine, it will answer as a cement to make india rubber adhere to wood. There is no cement that can make wood and glass adhere permanently together.

C. W., of Ohio—Pencils are pressed in dies to give them a fine finish.

E. M. B., of Pa.—Engravers use a common hard pencil to draw designs on wood; they first rub a little chalk and moisture, or fine white pumice, on the block, to form a white ground; "Chambers' Information for the People," gives an account of wood engraving.

M. D. P., of N. Y.—We do not know where you could get a one-horse power engine to work your sixteen inch crank. We never would use an engine having such a small bore. There can be no doubt but a one horse power is equal to that of five men working on the same crank as the engine, but a one-horse engine involves more friction than a four horse power, in proportion to their size.

E., of Va.—A paddle wheel to revolve and measure the rate of a vessel's sailing, would not be patentable by being merely connected with a rovolving indicator; all steamships have such indicators moved by the revolutions of the mainshaft. They do not give the amount of slip, but the number of revolutions multiplied into the circumference of the wheel, gives the vessel's speed, allowing for slip.

J. C. S., of Ohio—No such molasses as those described by you could be sold in this city. There are various ways of purifying molasses, but it requires expensive apparatus to do this on a large scale. If you stir an ounce of fresh slacked lime into every gallon of molasses, pour in some boiling water, and then, after standing half an hour, filter them through a cloth, you will find the taste much improved.

A. F., of Ill.—The small screw of two inches is just as powerful as one of twelve inches. There is no power in the screws themselves, so the dispute about the difference of power among your mechanics has been a waste of words. The power is the force applied to operate them. The power required to work each screw will just be in proportion to the area of the blades or thread, and the velocity given to them.

A. H., of N. Y.—Yours will be attended to next week.

G. M., of Ill.—You are mistaken in regard to the action of electricity. You may depend upon it that those houses having conductors and yet were struck with the electric fluid had defective conductors. A glass knob on the point of a conductor will destroy its utility.

J. B. B., of Lake Superior—A propeller balloon is not new to us. Capt. Taggart made a number of ascents with one about six years ago, and on one occasion we saw him come near losing his life. Carbonic acid is too sensitive to heat and cold to be used for inflating balloons. If you can dress lumber as cheap as you have stated, capitalists, no doubt, could be found by you to engage in the business. The ventilating chimney-cap you describe is illustrated on page 160, Vol. 9, Sci. Am., but we have been told it will not cure a smoky chimney overtopped by an adjacent building.

J. A. R., of N. Y.—The mastic cement used for the outside of houses in this region is composed of dry sand, a little plaster of Paris, and marble dust, slightly moistened with boiled linseed oil; the bricks to receive it are first coated with boiled oil.

J. F. S., of Iowa.—All reeds yield fibrous materials capable of being made into paper, rope, &c. Blake's fireproof paint is very good for the roofs of houses. Pitch, tar, and sand, mixed together, makes a good cheap roofing composition. You must apply it hot, then cover its entire surface with sand and fine gravel.

C. H. I., of Mass.—The suggestion you offer in regard to checks for money paid to conductors, is a good one we think, but it could not be considered as a patentable novelty.

W. W. B; of Wis,—Yours has been received.

S. B., of N. Y.—The water engine described by you could not be patented. You will find one similar to it illustrated in Vol. 3, Sci. Am. There are quite a number of water pressure engines in operation in various parts of Europe.

W. M. B., of Mo.—The scales of fish perform no office in their propulsion, so far as we know; we cannot conceive how each scale acts as an oar; we are sure this cannot be so with the scaleless finny tribes.

M. H., of ——.—Gum arabic will impart a fine loss to water colors. The enamel on Chinese ware is burned on in a kiln.

S. Oppenheimer of Peru, Ind., wishes to purchase a machine capable of splitting barrel hoops, particularly out of ash timber.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, April 12, 1856:—

E. L. B., of N. Y., $30; T. B., of N. Y., $100; W. E. Jr., of Ill., $15; A. D. B., of Ga, $30; J. P., of N. Y., $55; C. H. B., of Conn., $30; A. G., of Ind., $35; W. H., of O., $25; W. & U., of O., $55; D. & McN., of N. Y., $30; E. J. A., of Vt., $30; C. P. C., of Mass., $30; T. M., of N. Y., $35; R. F. G., of Ill., $25; J. H. C., of Pa., $25; E. H., of N. Y., $25; C. & H., of R. I., $220; O. D., of Md., $20; W. H., of Pa., $30; W. I., of N. Y., $30; P. L. & B., of N. Y., $400; F. C. G., of N. J., $20; N. N., of Ill., $25; S. L., of Ill., $25; E. A., of N. Y., $25; J. F. T., of S. C., $32; J. L. G., of Ga., $20; M. O. C., of C. W., $30; W. C., of N. Y., $25; J. G. S., of N. Y., $75; A. B., of Conn., $25; R. G., Jr., of Mass., $55; P. H. Van A., of N. J., $25; A. D., of N. Y., $55.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, April 12:—

J. S. J., of Pa.; W. H, of O.; W. C., of N. Y.; W. S., of N. Y.; C. W. Jr., of N. Y.; E. A., of N. Y.; J. G. H., of N. J., (3 cases); N. N., of Ill.; S. L., of Ill.; S. H. & M. C. W., of Pa.; W. D. U., of N. C.; R. F. G., of Ill.; J. H. C., of Pa.; C. M. L., of N. H.; E. H., of N. Y.; A. B., of Conn.; R. G., Jr., of Mass.; P. H. Van A., of N. J.; A. D., of N. Y.

Important Items.

Back Numbers Volume XI—We are no longer able to supply complete sets of the present volume. The numbers which are entirely exhausted are 6, 12, 14, 15, 17, and 19. Any other numbers up to the present we are able to supply to any who may wish them. Those who order the back numbers from the commencement of the volume will receive such as we have, and their subscription will be entered up enough longer to compensate for the numbers which we are unable to supply

Receipts—When money is paid at the office for subscription, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a bona fide acknowledgment of the receipt of their funds.

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Over *three thousand* Letters Patent have been issued, whose papers were prepared at this Office, and on an average *fifteen*, or *one-third* of all the Patents issued each week, are on cases which are prepared at our Agency.

An able corps of Engineers, Examiners, Draughtsmen, and Specification writers are in constant employment, which renders us able to prepare applications on the shortest notice, while the experience of a long practice, and facilities which few others possess, we are able to give the most correct counsels to inventors in regard to the patentability of inventions placed before us for examination.

Private consultations respecting the patentability of inventions are held free of charge, with inventors, at our office, from 9 A. M., until 4 P. M. Parties residing at a distance are informed that it is generally unnecessary for them to incur the expense of attending in person, as all the steps necessary to secure a patent can be arranged by letter. A rough sketch and description of the improvement should be first forwarded, which we will examine and give an opinion as to patentability, without charge. Models and fees can be sent with safety from any part of the country by express. In this respect New York is more accessible than any other city in our country.

Circulars of information will be sent free of postage to any one wishing to learn the preliminary steps towards making an application.

In addition to the advantages which the long experience and great success of our firm in obtaining patents present to inventors, they are informed that all inventions patented through our establishment, are noticed, *at the proper time*, in the Scientific American. This paper is read by not less than 100,000 persons every week, and enjoys a very wide spread and substantial influence.

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HECKER & BROTHER,
32 4* 267 Cherry st., New York.

PAGES PATENT PERPETUAL LIME KILN, will burn 100 bbls. lime with three cords of wood, every 24 hours, likewise my coal kiln will burn 150 bushel with 1 tun bituminous coal in the same time; coal is not mixed with limestone. Rights for sale.
32 4 C. D. PAGE, Rochester, N. Y.

UNITED STATES PATENT REVOLVING Measure.—Inventor and manufacturer, Louis Young. The following assortment will soon be offered to the public:—4 wheel, length 25 to 50 feet; 6 wheel, 50 to 500 ft.; 12 wheel, 100 to 1000. Surveyor's or Mile Measure; 10 link wheel, length one mile or more. The patentee is willing to dispose of part of the patent. For particulars apply to SAMUEL COLMAN, 6 Wall st. 1*

MACHINISTS' TOOLS.—Meriden Machine Co have on hand at their New York Office, 15 Gold street, a great variety of Machinists' Tools, Hand and Power Punching Presses, Forcing Pumps, Machine Belting, &c., all of the best quality. Factory West Meriden, Conn. 32 13*

LOCOMOTIVE WOOD—Winter's American Wood Sawyer is particularly adapted for cutting wood for locomotive wood; is capable of cutting 75 to 100 cords in a day. Patented 1854. State and road rights for sale; for particulars address WM. WINTER, Rondout, N. Y.
32 4*

SMUT MACHINES—A. NEWBURY & CO., of Windham Center, N. Y., are manufacturing a superior article; having been thoroughly tested for a number of years, they are found inferior to none in cheapness, durability, and in the quality of their work. Price $50.
32 4*

A STEAM WOOLEN FACTORY, and Four Lots, situate on Chestnut street and the Canal—Factory of Brick, 40x50 feet—three stories high and an attic—with two set of first rate eastern machinery and two custom carding machines; engine and Dye House 40x50 feet, two stories high, together with other out-houses. Apply to H. CULLUM, Meadville, Pa. 1*

CAUTION—The public are hereby cautioned against purchasing any right for improvement in Horse Shoes. Patented 25th of July, 1854 by W. H. Towers, from Geo. S. Earle or E. B. Strong, as the power of attorney under which such sales may be attempted to be made was revoked some months since. W. H. TOWERS,
32 4

HARRISON'S GRIST MILLS—20, 30, 36 and 48 inches diameter, at $100, $200, $300, and $400, with all the modern improvements; Bolters, Elevators, Belting, &c. &c. Also, Portable and Stationary Steam Engines of all sizes, suitable for said Mills. Apply to
32 eowtf S. C. HILLS, 12 Platt st., N. Y.

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VERTICAL STEAM ENGINE and Boiler for Sale at a bargain. The Engine is nearly new, and well finished. The cylinder is 9 inches; the fly wheel is a band wheel 5 feet in diameter, face 14 inches, turned off, weight 1350 lbs. The boiler is 20 feet long, 42 inches in diameter, 1 flue 17 inches, well braced wrought-iron heads; it is very strong, and has been in use about six months; is about 15-horse power. Cost $1200, will be sold for $675 cash; delivered on ship board. Apply to MUNN & CO., at this office.

TO MANUFACTURERS.—For Sale or to Lease. Sites for the erection of buildings for manufacturing purposes, on the north bank of the Passaic, on the line of the New Jersey Railroad, about one mile and a half from Newark, and near the East Newark Station, lying between the cities of New York and Newark, offering facilities for water, railroad and good turnpike communication, with both, at all seasons. This location is admirably adapted for manufacturing purposes, particularly where much space is needed. For particulars apply to S. J. GUSTIN, 10 Center st., Newark; or to JAMES M. THORBURN & CO., 15 Johnst., New York. 31 2*

HOWARD'S IMPROVED DREDGING MAchines for working in a sea way. Warranted to do well in a heavy sea; calculated both to excavate and dispose of the earth, without the assistance of lighters or extra hands Also, dredges with machinery and hull arranged to suit all situations where excavations may be required; either with or without lighters, all manufactured at the Franklin Foundry, Albany, N. Y. For official account of the capacity of these dredges, see Capt. Webster's Report at Chicago, Ill.; Lieut. Meade's at Whitehall, N. Y., and Col. Trumbull's at Erie and Oswego, N. Y., on Dredges built for the U. S. Government No. 30, Vol. 10, Scientific American; No. 1 Vol. Journal of the Franklin Institute, and No. 151, Vol. 13, of the Artisan, London. For further particulars apply to D. S. HOWARD, now at Corpus Christi, Texas, or to A. LOW, at the Franklin Foundry, Albany, N. Y. 31 2*

JAMES HARRISON, Jr.'s MANUFACTORY—Second Avenue, corner of 22nd st., New York. 31 4*

HARRISON'S 30 INCH GRAIN MILLS—Latest Patent.—A supply constantly on hand. Price $200. Address New Haven Manufacturing Co., New Haven, Conn. 31tf

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WOODWORTH PATENT Planing, Tonguing and Grooving Machines—The subscriber is constantly manufacturing and has now for sale the best assortment of these unrivalled machines to be found in the United States. Prices from $85 to $1450. Rights for sale in all the unoccupied towns in New York and Northern Pennsylvania. JOHN GIBSON, Albany Planing Mill, Albany, N. Y. 30 12*

A. H. BARTLETT'S HOT AIR FURNACE Now ready, and for sale at the foundry of Johnson, Cox, Cameron & Co., Spuyten Duyvil, N. Y. This furnace exceeds in power and economy any ever heretofore offered to the public. All orders should be directed to the patentee, Spuyten Duyvil, N. Y. An engraving and description of this really valuable furnace was given in Sci. Am., Vol. X. No. 25. 30 3*

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ALL PERSONS ARE CAUTIONED against recognizing, in negotiations with Silas G. Randall, of this place (now East,) a certain power of attorney given by me to him about a year and a half ago, as said power has been demanded, and is now retained against my wish.
J. HERVA JONES.
30 3* Rockland, Ill., March, 1856.

REED'S PATENT CHRONOMETER ENGINE. This is an improved Steam Engine for which Letters Patent were granted to John A. Reed, of New York, Jan. 9, 1855. The nature of this improvement consists in the increase of power about 20 per cent., and reducing the weight of the engine one half. The saving of fuel is effected by letting the steam in on both sides of the cylinder; doubling the size of the port, and balancing the pressure, removing the friction and weight of the slide valves, eccentrics, cross heads, connecting rods, &c. The exceeding simplicity of this engine renders it much more durable and easily managed than any other, and when placed upon the boiler with wheels it is portable though effective. These engines received the First Prize Medal at the Great Exhibition in Paris. There are about seventy-five of them now in oparation, all giving great satisfaction.

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3 " " - - -	200.	" " -	150.
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12 6m* WELCH & GRIFFITHS.

SHENCK MACHINERY DEPOT—163 Greenwich street, New York, keeps always on hand Lathes, Planers, Drills, Steam Engines, Woodworth's Patent Planing Machines, Belting, &c., in great Variety. Tools furnished of any size, to order, and of the best quality.
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CARPENTER'S ROTARY PUMP—For Pumping Hot or Cold Water, Lard Oil, &c. is (see good notice on both sides, in this paper, No. 29,) manufactured and for sale by D. C. HENDERSON, Sandusky, Ohio.
31 5*

A. L. ARCHAMBAULT, Portable Steam engine Builder, 15th and Hamilton st., Philadelphia.—Saw Mill Engines on Wheels from 10 to 30-horse power. Also Hoisting, Pumping, and Pile driving Engines, from 3 to 30 horse power. 25 8*

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BOILER INCRUSTATIONS—No scale will form in the boiler when Weissenborn's Patent Incrustation Preventor is used. At the same time the apparatus is the best Heater that can be obtained. Apply to E. W. SARGENT, Delmonico's Hotel, New York City. 25 12*

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LINEN MACHINERY—JOHN R. McNALLY Champlain, N. Y. Agent for the sale of linen machinery of every description, new and second hand. Engineers and machinists tools, and linen yarns of every number and quality. 22 13*

PATENT ALARM WHISTLE—For Speaking Pipes. The right of a limited number of the Southern States, of this valuable patent, for sale on reasonable terms. Apply to W. OSTRANDER, No. 57 Ann street, N. Y. 29 13

STEAM PUMPS AND FIRE ENGINES—Steam Pumping Engines for wrecking purposes, Irrigating and Draining Lands, Deep Mining Shafts, Quaries, and Excavations, Railroad Stations, Factories, Public Institutions, Hotels, Gas Works, Steamers, &c. Also a large and improved class of Pumping Engines for supplying Cities, Towns, and Villages. Apply to H. R. WORTHINGTON, 28 Broadway, New York City. 25 13*

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F. S. PEASE, 61 Main st., Buffalo, N. Y.
N. B.—Reliable orders filled for any part of the United States and Europe. 19tf

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NORCROSS ROTARY PLANING MACHINE.—The Supreme Court of the U. S., at the Term of 1853 and 1854, having decided that the patent granted to Nicholas G. Norcross, of date Feb, 12, 1850, for a Rotary Planing Machine for Planing Boards and Planks is not an infringement of the Woodworth Patent.

Rights to use the N. G. Norcross's patented machine can be purchased on application to N. G. NORCROSS,
208 Broadway, New York.

Office for sale of rights at 208 Broadway, New York Boston, 27 State street, and Lowell, Mass, 19 25m*

GRAIN MILLS—EDWARD HARRISON, of New Haven, Conn., has on hand for sale, and is constantly manufacturing to order, a great variety of his approved Flour and Grain Mills, including Bolting Machinery, Elevators, complete with Mills ready for use. Orders addressed as above to the patentee, who is the exclusive manufacturer, will be supplied with the latest improvements. Cut sent to applications, and all mills warranted to give satisfaction. 29tf

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Science and Art.

Improved Locomotive Link Motion.

The accompanying engravings represent improvements in Link Motions, patented March 20, 1855, by Messrs. Uhry & Luttgens, Paterson, N. J. The link motion is so extensively applied to locomotives and also to marine engines that any mechanic acquainted with its appearance will at once perceive the modification in the design here shown; but we believe that the effects or working of this motion are not so well understood. There was a time when it was almost entirely discarded on account of its defects. Still, it has one advantage over a common lap valve moved by an independent eccentric, in connection with an independent cut-off, viz., that the exhaust does not commence within 1-4 of an inch from the end of the stroke, as it does in case of the latter, but graduates with the degree of expansion, and therefore barely allows the steam to expand thrice its original bulk, even at the highest cut-off, thereby causing great loss of steam; though it is allowed that an engine, with it applied, will run faster and easier than with most other contrivances. Its defects are, too small a steam port, a too early exhaust, as already referred to, and early compression.

The method commonly employed with link motions to retard the time of exhaust, is to increase the inside lap, which, though it may be advantageous in a small degree in that respect, still increases the compression and chokes up the exhaust port.

If these defects may be radically remedied and that peculiarity of the link motion which contributes to its present efficacy be brought under the immediate control of the engineer, its introduction and use will be a matter worth the attention of engineers. These results are believed to be fully accomplished by the inventors of the present improvements. They have lately made a series of practical experiments, in which the superiority of their invention was abundantly demonstrated. We are obliged to omit the tables referring to the same.

On these trials the improved link motion operating upon a single valve had 3-32 inside lap, and presented some decided advantages over the common links, among which are the following: The lead only uses about 1-2 to 1-3 of the time of the stroke to open before the commencement of the next, than on the common link, where it increases to the amount of two and three inches of the stroke of the piston at the higher notches; further, the steam port is more than doubled and the time of exhaust is retarded at the higher grades of expansion, while the exhaust port opens nearly three times as quick at these points as with the common link, while the amount of inside lap given to the valve has barely any effect upon the compression, as it nearly commences with the point of the exhaust.

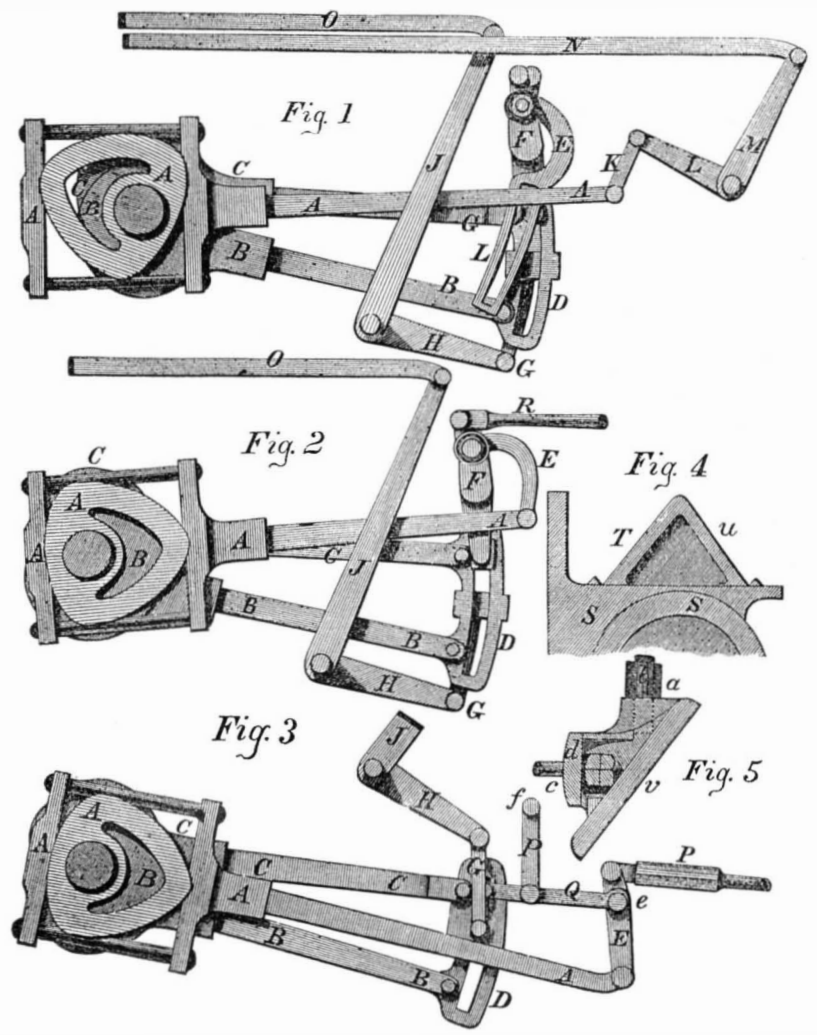
The inventors are of the opinion that compression, in a measure, and where rightly applied, may be an advantage—just as a spring is to a trip-hammer—and it will never of itself cause any loss of steam; but it is necessary that that force which it is calculated to neutralize should yet have an existence, viz., part of the momentum of the reciprocating parts. But this is by no means the case on the common link motion, as the exhaust coming in too early, thus preventing the steam to act while yet efficient; the momentum of the reciprocating parts has expanded itself before it meets the compression, the latter thus directly opposing the motion of the engine, and thus, as it has been shown by experiments, say the inventors, causes a loss of from 20 to 25 per cent. of the power at the highest notches.

In the engravings the same letters refer to like parts on all the figures. D represents a common shifting link, supported by connecting link, G, which latter is attached to the reversing lever, H and J, being operated by the reversing rod, O; the link, as usual, is operated by two eccentrics, B and C,—C acting in the forward, and B in the back motion. The link is provided with a die, which, in figs. 1 and 2, operates the rocker, F, while in fig. 3 it actuates connecting rod, Q, suspended by the link, P', at *f*, to some part of the framing of the engine. Besides the rocker, F, there is a differential rocker, E, operated by an eccentric or cam, A, and partakes also at its fulcrum of the motion communicated by the link, at a point shown in fig. 3 by letter *e*. The upper end of this rocker operates, in fig. 1, the exhaust valves, while in figs. 2 and 3 it communicates, by valve rod, P, motion to a single valve. In fig. 1 the lower extremity of this rocker is provided with a slotted segment, bearing a block attached to rod, A, being connected by link, K, to the reversing lever, L M, which is held and operated by the reversing rod, N. In fig. 3 the valve rod, P, moves in a guide attached to the framing of the engine.

Fig. 4 represents the arrangement of the valve seats, T and U; S representing the steam cylinder.

Fig. 5 represents a plate, *v*, resting upon the exhaust valve, and which may be used to balance the latter; the bolt, *c*, holds this plate to the side of the steam chest, the face, *d*, being slightly curved, to permit oscillation, while the hollow bolt, *a*, and the central bolt, *b*, adjust it in its position. There are two bolts, *c*, and two or more bolts, *a b*, near the end of the plate. The bolt is provided with a thread on the outside fitting in the steam chest cover,

IMPROVED LINK MOTION FOR LOCOMOTIVES.



the bolt, *b*, having a shoulder resting on the top of bolt *a*, while its nut is secured in *v*.

The figs. 4 and 5 form part of the motion of fig. 1, and the balancing of the larger valve is accomplished in a simple manner, as no provision need be made for the escape of compressed steam, as the small plate upon the valve seat, *n*, and which is moved by the ordinary link motion, will open the communication.

The position of the cam in relation to the eccentrics in the several figures is as follows: If the eccentrics in all the figures be brought in a vertical position, so that a perpendicular tangent will touch the peripheries of both eccentrics, then a horizontal center line drawn through the center of the axle will form in fig 1 an angle of twenty-five to thirty-five degrees with the center-line of the cam to the relative position of the eccentrics, as shown in the engravings; in figs. 2 and 3 from five to ten degrees with the center-line of the cam, above or below the horizontal center-line, depending upon the direction in which the point of con nection is located however the position of the cam may be varied, and different results thus obtained, as various modifications may also be produced by the amount of throw, and the point where the shaft passes through the cam. The proportion of throw and lap adopted in the experiments were for the eccentric, 5-inch throw, cam 6-inch. throw, the valves having from from 1 1-8 to 1 1-4-inch outside lap.

A modification of these improvements is a small cam or eccentric placed and adjusted at *e*, fig. 3, the yoke or strap surrounding it forming part of the valve rod, P, while the cam or eccentric is attached to lever, E, and the extremity of the rod, A, instead of being connected to a cam or eccentric on the axle is secured by a pin to the framing of the engine.

The cam described in the foregoing description can be easily applied to all engines. It may either be cast together with the back eccentric, or if applied to any old engine, cast in two separate pieces and bolted to the former. The wear of the cam is inconsiderable, because it operates the valve through the intervention of the leverage of the differential rocker, the main power being derived from the link.

The inventors of these improvements are practical engineers, and fully understand what is wanted upon locomotives to insure safety, economy, and speed. More information may be obtained by letter addressed to them at Paterson, N. J.

Cobalt and Nickel.

M. Deville, in a paper before the French Academy, suggests "that other more common metals than aluminum are perhaps less known than may be thought, and he expressed the hope that when he shall have completed a memoir on the pure metals, produced and melted by certain, yet secret, processes, which he has long been preparing, he shall exhibit some unexpected results. Thus he instanced cobalt and nickel, which possess useful physical properties, such as malleability, ductiliy, &c., developed to a most extraordinary degree; further, they enjoy a tenacity far exceeding that of iron, which hitherto has passed as the most tenacious metal; for, according to the experiments made by M. Wertheim on these metals, the weights which determine the rupture of wires of iron, cobalt, and nickel of the same dimensions are 60 for iron, 115 for cobalt, and 90 for nickel, which shows the tenacity of cobalt double that of iron; besides, nickel and cobalt are worked at the forge with the same facility as iron, are oxydized less easily than iron, and are susceptible of being employed in the same manner as iron."—[Annual of Scientific Discovery, 1856.

The North river was open to Albany on the 10th inst.—last week. The *South America* was the first steamboat that made the trip up. The river has been closed for nearly four months.

Literary Notices.

CHEMISTRY: THEORETICAL, PRACTICAL, AND ANALYTICAL—This is the title of a new work on Chemistry, as applied to the arts and manufactures, by Dr. S. Muspratt, F. R. S., and re-published by Russell & Bro., 12 Tremont St., Boston, in numbers (25 cents each.) From the specimen before us it gives evidence of being a complete encyclopedia of chemistry. The engravings are excellent, so is the letter press, and any work edited by Dr. Muspratt cannot fail to be profound and thorough.

HUNT'S MERCHANTS MAGAZINE for this month contains an able article on the "Improved Condition of Labor," by George M. Weston, in which it is clearly demonstrated that with improvements in machinery and the arts, the value of labor has also increased.—It presents a strong argument in favor of the humanizing influence of useful inventions.

THE BIBLIOTHECA SACRA for this month opens with a profound essay on "The Moral Faculty," by Professor Joseph Haven, of Amherst College. An essay on "The Influence and Method of English Studies," by Professor Shedd, of Andover, should be read by every young man who desires to possess a sound and vigorous style of speaking and writing the English language. Published by Warren F. Draper, Andover, Mass.

FARM JOURNAL AND PROGRESSIVE FARMER—We regard this monthly, published at Philadelphia, as one of the very best agricultural journals in our country, and recommend it to those of our subscribers who wish to be fully posted-up in all that relates to progressive agriculture. Its articles are not a mere re-hash of things which have been published a thousand times before, but are the contributions of some of the ablest agriculturalists, investigators, and scientific men in our country. Among the contributors to recent numbers we notice the names of Dr. A. A. Hayes, Dr. Sam L. Dana, author of the Mechanical Manual, Lieut. Maury, David A. Wells, and others. Its terms are only $1 per annum.

BLACKWOOD'S MAGAZINE—The number for this month of "old ebony" is capital. The first article in it is a review of Roman History. An article on "Biography gone Mad" is both humerous and satrical, and especially so to American readers. "Nicaragua and the Fillibusters" forms the subject of another article, in which Walker and his men meet with a favorable notice, and the advantages of the introduction of American influence in Nicaragua are pointed out. This is rather strange for a British Tory magazine. Re-published by L. Scott & Co., 54 Gold st., this city.

NORTH BRITISH REVIEW—This sterling periodical for this quarter contains nine able essays. One on Color Blindness is deeply interesting to men of science and the public generally. This number is one of the best ever published. As the high literary organ of the Free Presbyterian Church of Scotland it has earned for itself a world-wide celebrity. It is published by Leonard Scott & Co., 54 Gold st., this city.

DINSMORE'S AMERICAN RAILWAY GUIDE—Published by Dinsmore & Co., No. 9 Spruce st., for this month is an indispensable guide to all who wish to travel by the rail

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